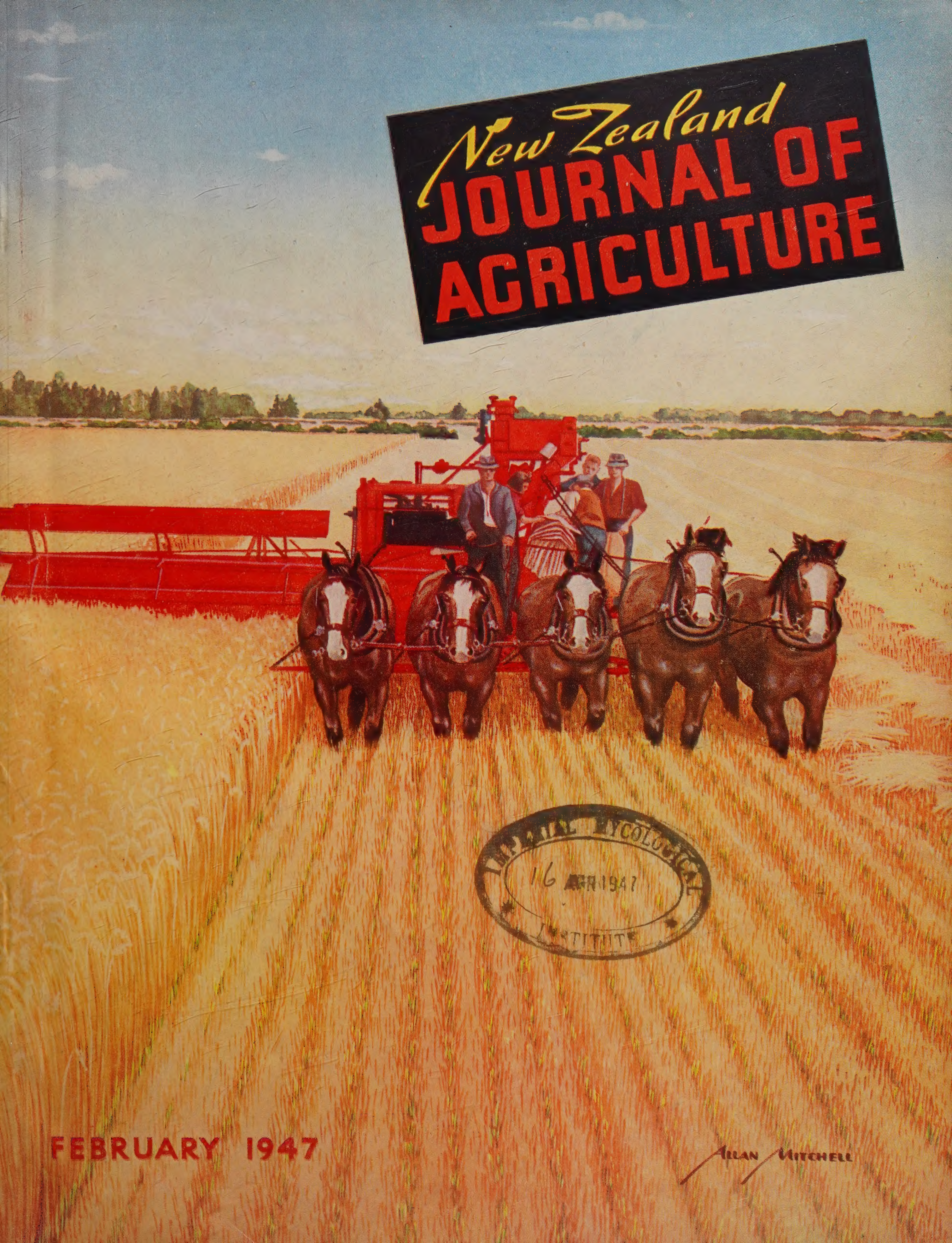
# New Zealand
# JOURNAL OF AGRICULTURE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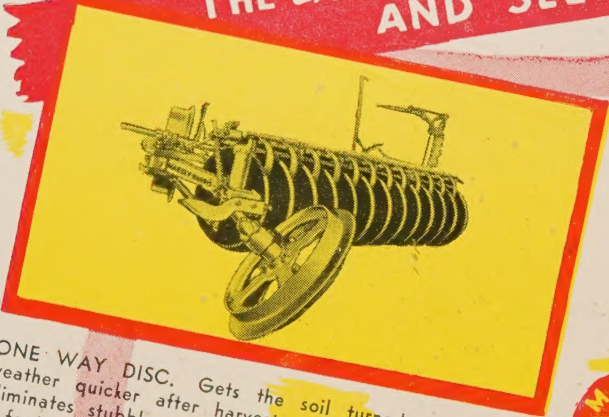

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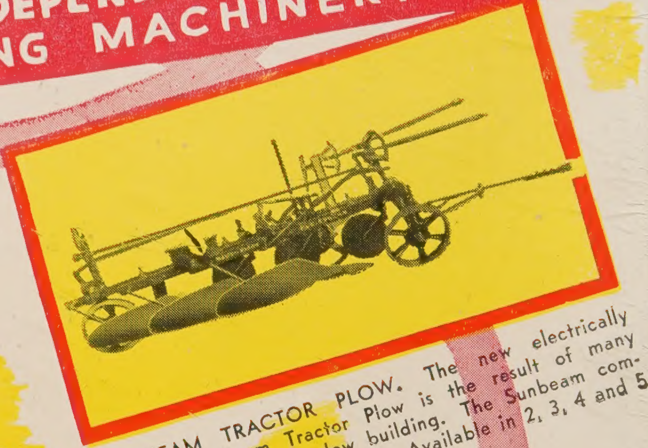

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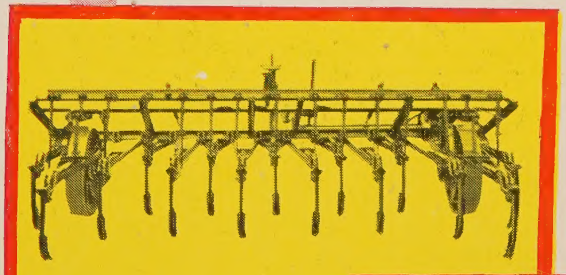

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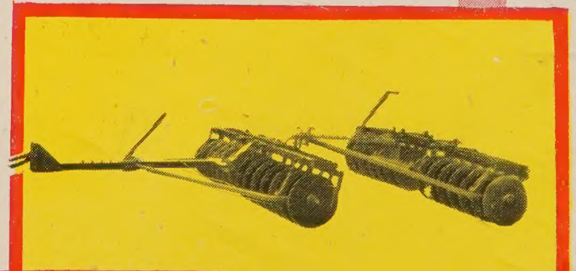

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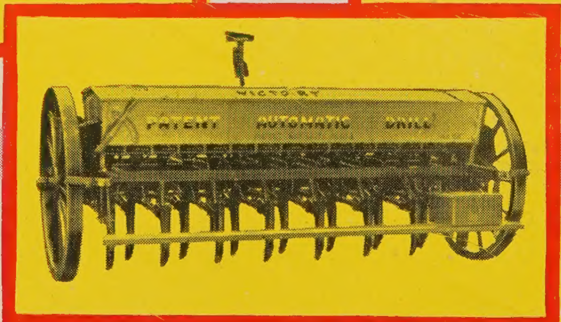

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# MORE WHEAT NEEDED

*By* **G. K. McPHERSON,** *Instructor in Agriculture, Ashburton.*

WHEAT must rank as one of New Zealand's most important crops—if not the most important. From it bread, the principal staple food of the country, and other forms of food containing wheaten flour are made. The poultry industry is also largely dependent on wheat, and two by-products of wheat, bran and pollard, are important stock foods. The history of wheat growing in New Zealand and the economic importance of the crop in the Dominion's agriculture are discussed in this article; the place of wheat in the rotation, the growing and harvesting of the crop, the main varieties grown, and the fungous diseases and insect pests parasitical to wheat are also described.

THE value of wheat was so obvious that it was naturally the first crop to demand the attention of early settlers in this country, and wherever it was possible to produce the crop it was grown. Under favourable soil and climatic conditions excellent yields were usually obtained, and with the demand for wheat from abroad the crop could be relied upon to provide steady returns.

The advent of refrigeration in the late 'eighties, however, gave a tremendous impetus to pastoral farming. The higher-rainfall areas were gradually grassed down in permanent pastures, and with dairying and fat lamb production proving successful, wheat growing gradually became concentrated in drier areas where it was found advisable to plough and regrass periodically. Wheat growing thus became restricted mainly to Canterbury and North Otago, where there was an annual rainfall of 25 to 35in. and large expanses of flat country suited to cultivation.

**Today the system of farming operating throughout these areas consists largely of the blending of fat lamb production and the growing of wheat. Other crops such as barley, oats, and peas are produced, but wheat is the main crop grown on many farms; in fact it is an essential crop in the farm economy on many arable farms.**

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# TABLE OF CONTENTS—FEBRUARY, 1947.

Vol. 74, No. 2. February 15, 1947.

More Wheat Needed—G. K. McPherson 113
Show Dates 122
Aims of United Nations Food and Agriculture Organisation—J. V. White 127
Improved Strain of Timothy Seed Available—J. H. Claridge 130
Choice of Time and Type of Topdressing—P. S. Syme 131
Coke-breeze Sleeping Floors for Pig Houses—A. Longwill 132
Cause and Prevention of Silver Leaf in Orchards—G. H. Cunningham 137
Autumn-sown Pastures—P. S. Syme 141
Determining Tonnage of Stacked Hay—A. D. Mercer 144
Tomato Research in England—Sir Theodore Rigg 145
Small Fruit Culture—J. P. Hudson 147
Weed Seeds in Agricultural Seed—E. O. C. Hyde 150
Uncapping Honey Combs—I. W. Forster 153
New Zealand Veterinary Association Conference 155
Budding of Citrus Trees—J. E. Hume 157
Responsibilities of Vendors under Stock Foods Act 160
Facial Eczema Precautions—J. E. V. Simpson 161
Lambing Estimates for 1946 162
The Home Garden—D. K. Pritchard 165
Studies in Farm Management: An Otorohanga Dairy Farm—K. M. Montgomery 171
Calves Temporarily Blind after Phenothiazine Drenching—L. K. Whitten 179
Farm Work for March 181
Prevention of Scabby Mouth by Vaccination—J. J. G. Peddie 182
Control of Pullorum Disease in Poultry—F. C. Bobby 183
Porker and Baconer Competitions—D. M. Smith 187
Tractor Inter-row Cultivation—J. H. Hitchcock 191
Radio Broadcasts 197, 199
"The Good Neighbour," by Mary 205
Finishing Touches to the Home—Norma K. Metson 206
Planning for Winter and Spring Flowers—J. P. Hudson 209
A Home-made Divan-type Seat—Eva Topping 213
First Aid in the Home—C. Meachen 215
Variety in Salads—Eva Topping 219

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The relationship between wheat production and the total population of the Dominion is interesting. In 1880 there were 685 acres of wheat grown for every hundred head of population; in 1900 there were 26 acres of wheat for every hundred people, and in 1940 the figure was still further reduced to 15.4 acres of wheat for every 100 head of population.

It has been estimated that the average annual consumption of wheat in New Zealand is 4.6 bushels per head of population. On present yields, therefore, one acre of wheat provides sufficient flour for about seven persons; based on a population of one and three-quarter million people, approximately 250,000 acres of wheat are therefore necessary to provide sufficient flour for civilian requirements alone; additional acreage would of course be necessary to provide wheat for the poultry industry, for resowing, and other purposes.

Before the war New Zealand required for all purposes about 9,500,000 bushels of wheat a year. The requirement increased during the war to about 13,000,000 bushels, the use of which was distributed somewhat as follows:—

| | Bushels. |
|---|---|
| Flour .. .. .. .. .. | 8,000,000 |
| Feed, poultry . .. .. .. | 4,000,000 |
| Seed, resowing .. .. .. | 500,000 |
| Miscellaneous .. .. .. | 200,000 |
| Total .. .. .. .. | 12,700,000 |

About a quarter of a million acres has been sown to wheat annually in New Zealand in recent years. Table I below shows acreages and yields over the four seasons 1940-41 to 1943-44.

In the yield of wheat per acre New Zealand is one of the leading countries in the world. For the period 1926 to 1936 Canada averaged 14.6 bushels per acre and Australia 11.5 bushels per acre. Over the same period the area sown to wheat in these two countries annually averaged 25.5 million acres in Canada and 12.75 million acres in Australia.

The suggestion frequently made that wheat yields in New Zealand are on the decline is not substantiated by Table II, which gives acreages and yields of wheat in 10-yearly periods since 1890.

### TABLE II: TEN-YEARLY ACREAGES AND YIELDS SINCE 1890

| Period. | Average yield per acre. Bushels. | Average annual acreage. |
|---|---|---|
| 1890-1900 .. | 24.4 | 296,000 |
| 1900-1910 | 31.4 | 224,000 |
| 1910-1920 .. | 28.0 | 229,000 |
| 1920-1930 .. | 31.5 | 231,000 |
| 1930-1940 .. | 31.1 | 244,000 |
| 1940-1944 .. | 33.2 | 255,000 |

The excellent wheat yields obtained before and during the earlier part of this century no doubt entailed exploitation of the natural fertility of the soil, but yields have been maintained in more recent years, possibly because of the gradual replacement of horses by tractors, the more widespread use of fertilisers, and the growing of varieties more suited to the soil and climate.

Canterbury provides the major portion of the Dominion's wheat; it is also grown in Southland, Otago, Marlborough, and, to a small extent, Nelson, while the North Island contributes a small proportion. In the 1943-44 season wheat areas of the Dominion were distributed as follows:

| Province | Acreage grown | Percentage of total area | |
|---|---|---|---|
| Wellington .. | 6,308 | 2.7 | 3.6% North Island |
| Hawke's Bay .. | 2,033 | 0.8 | |
| Balance North Island .. | 221 | 0.1 | |
| Canterbury .. | 181,538 | 77.6 | 96.4% South Island |
| Otago .. .. | 28,228 | 12.2 | |
| Marlborough .. | 7,921 | 3.4 | |
| Southland .. | 6,970 | 2.9 | |
| Nelson .. .. | 567 | 0.3 | |

### TABLE I: ACREAGES AND YIELDS OF WHEAT 1940-41 TO 1943-44

| Harvest of | Acres | Bushels per acre. | Total production bushels. |
|---|---|---|---|
| 1940-41 .. .. .. .. | 243,197 | 34.1 | 8,305,845 |
| 1941-42 .. .. .. .. | 258,002 | 33.6 | 8,671,244 |
| 1942-43 .. .. .. .. | 286,998 | 34.2 | 9,819,342 |
| 1943-44 .. .. .. .. | 233,786 | 30.8 | 7,208,485 |
| Average .. .. .. .. | 255,495 | 33.2 | 8,501,229 |

### TABLE III: PERCENTAGES OF TOTAL AREA SOWN TO VARIETIES IN 1938-39 TO 1943-44

| Variety | 1938-39 | 1939-40 | 1940-41 | 1941-42 | 1942-43 | 1943-44 |
|---|---|---|---|---|---|---|
| S.S. Tuscan .. | 45.9 | 29.91 | 38.44 | 33.45 | 23.94 | 19.82 |
| Cross 7 .. .. | 33.14 | 38.94 | 41.63 | 48.74 | 59.35 | 59.48 |
| Fife Tuscan .. | — | — | *0.10 | 0.92 | 3.29 | 7.32 |
| Hunters .. .. | 9.3 | 9.6 | 8.39 | 7.00 | 4.79 | 4.76 |
| Dreadnought .. | 4.4 | 5.26 | 6.59 | 6.25 | 4.52 | 5.8 |
| Jumbuck .. .. | 3.1 | 2.27 | 2.12 | 1.20 | 1.12 | 0.8 |
| Marquis .. .. | 1.9 | 1.85 | 1.01 | 0.44 | 0.37 | 0.2 |
| Other varieties .. | 2.26 | 2.27 | 1.72 | 2.0 | 2.62 | 1.82 |

* First season this variety was grown commercially.

The low wheat acreages for the North Island and for Southland illustrate very well that where it is possible to produce and maintain highly-productive permanent pastures wheat is not a popular crop. Even in Canterbury there is a tendency for the wheat area to decline in some localities where liming, topdressing, and the use of improved pasture and clover strains has resulted in a more permanent type of pasture.

## Varieties

The wheat varieties Cross 7 and Solid Straw Tuscan have been sown on about 80 per cent. of New Zealand's total acreage in wheat in recent years. Other varieties of less importance are Fife Tuscan, Hunters, Dreadnought, Jumbuck, Marquis, and Tainui.

Table III below shows the trend of the sowings of the main varieties grown in the Dominion during the past six seasons.

The figures show that Cross 7 and Fife Tuscan are gradually replacing Solid Straw Tuscan and, to a less extent, Hunters, Jumbuck, and Marquis. The area in Dreadnought shows very little variation over the six seasons.

The varieties listed can be classified into three groups:—

(a) **Solid Straw Tuscan, Fife Tuscan, and Cross 7.** These are good-yielding wheats on the average wheat land and their popularity is further enhanced because all of them are very suitable varieties for direct heading.

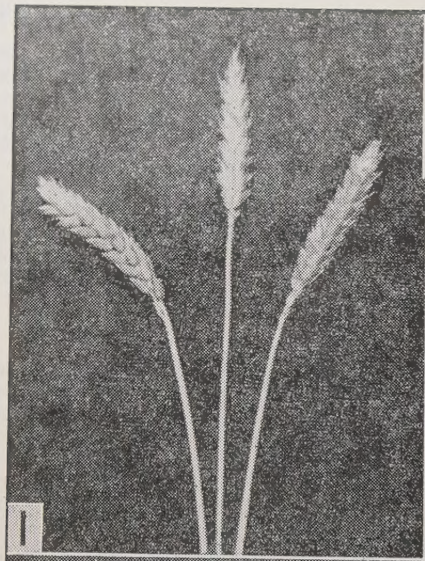
(b) **Hunters and Dreadnought.** Both these varieties are now confined mainly to isolated pockets of fertile soil in areas not usually subject to very strong winds. Neither variety is suitable for direct heading, and they are therefore grown only in preference to Cross 7 or Tuscan in those areas where the extra return obtained will more than compensate for the difference between the cost of harvesting by direct heading and the cost of stook threshing or picking up from the windrow. Both varieties are regarded as autumn wheats.

(c) **Jumbuck and Marquis.** Although they can be sown in the autumn, both varieties are recognised as spring wheats. Usually they are reserved for sowing in late spring, when it is considered too late for sowing Cross 7 or Tuscan. Neither variety is suitable for direct heading.

## Main Varieties' Characteristics

**Solid Straw Tuscan.**—Usually referred to only as Tuscan. Less than 10 years ago it was the most popular

# WHEAT VARIETIES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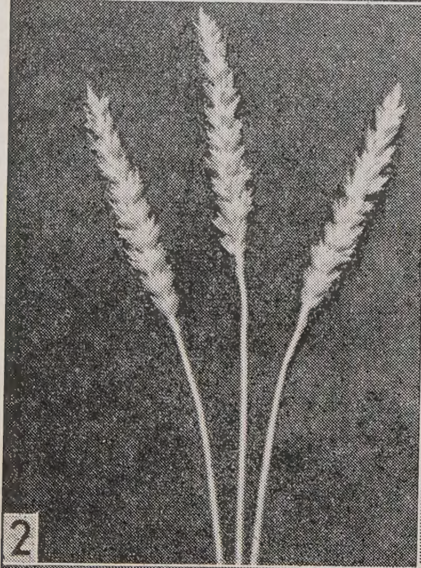
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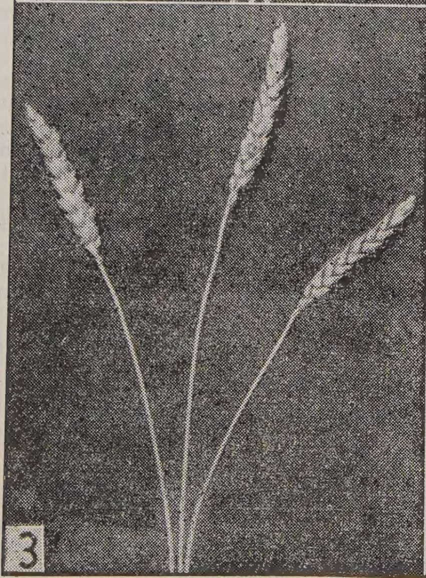
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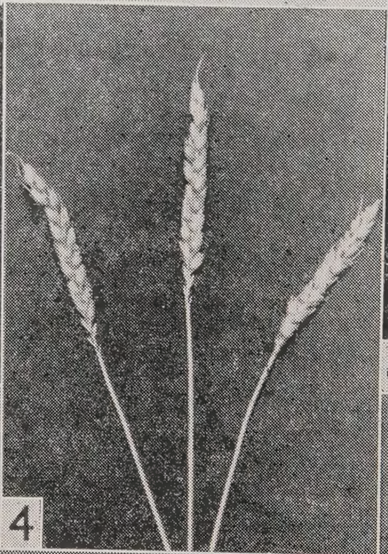
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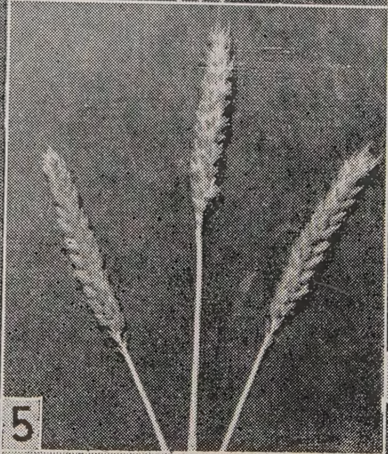
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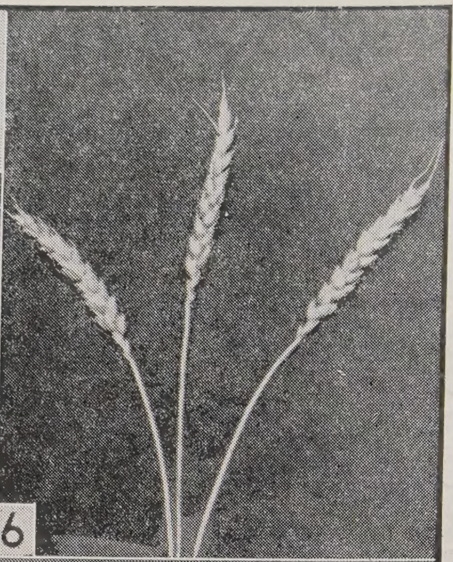
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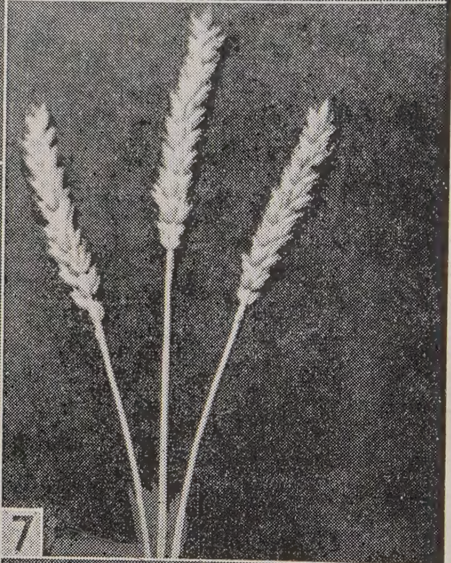
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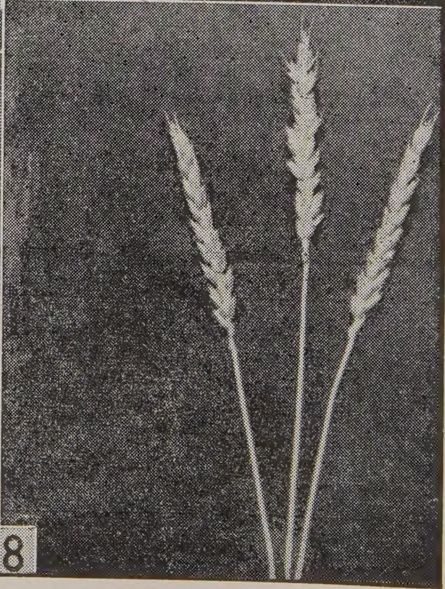
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1. HOLDFAST
2. MARQUIS
3. CROSS 7
4. JUMBUCK
5. HUNTERS
6. SOLID STRAW TUSCAN
7. DREADNOUGHT
8. FIFE TUSCAN

wheat grown, about 70 per cent. of the wheat area of the Dominion being sown in this variety. Today Solid Straw Tuscan occupies less than 20 per cent. of the total area grown, and a still further decline in acreage of this variety seems likely in the future. Solid Straw Tuscan owes its popularity to the fact that it yields well on most soil types and is extremely resistant to shaking in strong winds. On the medium and lighter class of wheat land Solid Straw Tuscan has proved an exceptionally good wheat, but on heavy land it has a marked tendency to produce too much straw, and as the straw is inclined to be weak, crops frequently lodge so badly as to make harvesting difficult. This is its main defect. Tuscan is an autumn wheat, but it can be sown in the spring. Provided it does not lodge, it is a good wheat for direct heading.

**Cross 7.**—This wheat was produced in New Zealand by crossing Solid Straw Tuscan with a Canadian variety known as White Fife. The berry, like that of Tuscan, is held very tightly in the chaff, and the wheat is therefore ideal for harvesting by direct heading. It matures 10 days to a fortnight earlier than Solid Straw Tuscan, which is important in some localities. The straw is shorter and stronger than that of Solid Straw Tuscan, which is an advantage on heavy land where Tuscan is liable to lodge badly. Some indication of the popularity of Cross 7 can be gauged from the fact that although it was not grown commercially in New Zealand until 1935, in 1943 it occupied about 60 per cent. of the total wheat area of the Dominion. Cross 7 is more susceptible to loose smut than Solid Straw Tuscan. It is a good winter or spring wheat.

**Fife Tuscan.**—Another New Zealand-bred wheat, closely related to Cross 7, its parents being Solid Straw Tuscan and White Fife. In general appearance it resembles Solid Straw Tuscan. In length and strength of straw it is midway between Cross 7 and Solid Straw Tuscan. It yields slightly better than Solid Straw Tuscan, and experience suggests that it is less subject to straw break. It is a suitable wheat for direct heading, and is recommended for areas where Solid Straw Tuscan is sown nowadays. First distributed for sowing in 1940, Fife Tuscan in four seasons became the third most popular wheat in the Dominion, occupying in the 1943-44 season 7.3 per cent. of the total area sown. It is a good winter or spring wheat and matures about a week later than Solid Straw Tuscan.

Wheat sown in trial plots in the Methven district to determine varietal characteristics and reaction to varying treatments.

**Hunters.**—At one time Hunters was a popular wheat, but with the introduction of the header harvester about 12 or 15 years ago the variety declined rapidly in popularity. In the 1943-44 season Hunters occupied less than 5 per cent. of the total wheat area of the Dominion. On suitable country Hunters is an extremely heavy yielder, and although it has a hollow straw, it stands up fairly well on heavy land. Unfortunately, as the berry is held loosely in the chaff, there is too much risk in leaving crops to the stage when they can be direct headed. Hunters is usually cut with the binder and threshed from the stook. Sowings of Hunters nowadays are confined mainly to areas of heavy, rich ground where invariably the yields are good. Hunters probably produces the best quality straw for feeding stock, and farmers occasionally grow this variety for a stock of good-quality straw.

Because of its creeping habit of growth in the early stages Hunters takes a long time to mature and is best sown in late April or May. So far as is known it is not subject to loose smut.

**Dreadnought.** — Dreadnought falls into somewhat the same category as Hunters. The straw is hollow and strong, but the grain at maturity is readily shaken out by strong winds, and is not usually left for direct heading. It is customary to windrow the crop and pick it up with a header harvester or thresh it from the stook. The grain of Dreadnought is relatively large. Compared with Hunters, Dreadnought has less flag, and is therefore superior as a cover crop for grass. The growing of Dreadnought is mainly confined to special areas of extremely good soil where it yields very well. Mainly sown in the autumn, Dreadnought is now regarded as quite a good milling wheat.

**Jumbuck.**—Some years ago Jumbuck was grown fairly extensively in the North Island, but in recent years the variety has declined in popularity. Jumbuck has two bad features: the straw is weak and the grain is held loosely in the chaff. Many crops are therefore inclined to lodge badly, and it is not a wheat which can be left for direct heading unless grown in sheltered localities. Although it can be sown in the autumn, most of the Jumbuck grown nowadays is usually spring sown.

**Marquis.**—Like Jumbuck, Marquis is a wheat which has declined in popularity in recent years. In the 1943-44 season it occupied 0.2 per cent. of the total Dominion acreage. The straw is inclined to be weak, and it is not a variety which can be recommended for direct heading. The grain is small and a mottled red and yellow. Marquis is sown principally as a spring wheat. Very good results have been recorded in baking tests with flour from Marquis wheat.

**Tainui.**—This is an imported wheat with a Tuscan-like habit of growth. The straw, however, is weaker than that of Tuscan, but it resists wind well. Tainui is an early-maturing

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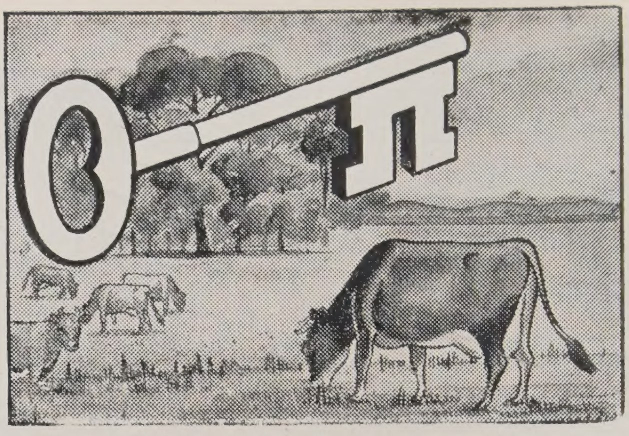

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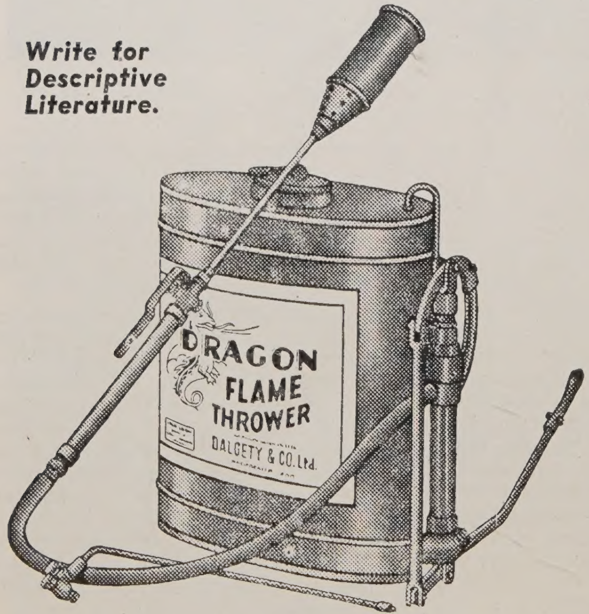

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wheat and is used mainly for spring sowing, particularly in some of the wheat-growing areas of the North Island.

## Place in Rotation

The place occupied by wheat in a rotation depends very largely on the quality of the land, the climate, and the type of farming practised. Even under similar conditions of soil and climate, however, the position that wheat occupies in a crop rotation varies considerably. As most farmers endeavour to sow their wheat when the land is in the best possible heart, wheat is very frequently sown after grass, after peas, or after fed-off crops such as blue lupins or rape. On marginal land wheat generally follows grass or a lupin crop, provided the land is clean and the farmer considers the soil is sufficiently strong to produce a good crop. Wheat may follow wheat, but usually only in very strong country and where the initial crop follows a period in which the land carried a good sole of grass. Under such circumstances the first crop may grow rank and develop a tremendous bulk of straw, and, should this happen, the second crop will frequently outyield the first. Experience suggests, however, that where wheat follows wheat the second crop is more susceptible to both take all and eye spot.

**It is recognised that the growing of too much wheat tends not only to deplete soil fertility, but also to impair the physical condition of the soil. It is usually difficult to work and difficult to establish and maintain a good sole of grass or clovers on land heavily cropped with wheat. Most farmers, therefore, adopt a rotation wide enough to avoid damage to the soil either chemically or physically. A routine largely practised throughout wheat-growing areas is: On heavy land a crop of wheat every four or five years; on medium land every five to seven years, and on marginal land every eight to ten years.**

## Porker and Baconer Competitions

In view of the all-round success of the Tomoana porker and baconer competitions during the past 6 years, the sponsors have decided to run similar competitions in July this year for both porkers and baconers. These will be held at Hastings, Patea, and Westfield, and £1000 in prize money will be offered.

There will be £100 in prizes for porkers and baconers in each district pig council area, making a total of £700 for the North Island. A grand championship will be decided at Westfield for both porkers and baconers, with prize money of £135. Special prizes amounting to £165 will be offered to members of Young Farmers' Clubs entering the competitions throughout the North Island.

## Preparation of the Land

Wheat is produced under such a wide variety of soils and climates that no hard-and-fast rules can be laid down for methods of cultivation, which must vary from district to district and often a great deal from paddock to paddock on individual farms. It is probably true, however, that in nine years out of ten no crop responds better than wheat to early and efficient cultivation.

It must be remembered, however, that the production of wheat is only one section of a farmer's activity, and that all his other farming operations are interlocked with or related to it. Any factor which influences one section of his work may indirectly affect all his other activities. It very frequently happens, therefore, that the methods the farmer intended to adopt in the matter of cultivation for wheat and the methods he was eventually compelled to adopt may be, and frequently are, totally different. The type of soil, weather conditions, the presence or absence of twitches of various kinds, the prevalence and size of stones, the power available, and the success or otherwise of other farm crops are some of the factors which frequently dictate to the farmer the type of cultivation he must pursue.

Following grass it is the usual practice to skim plough and summer fallow for wheat. After a paddock has been down in grass three or four years or more there is generally a tendency for some of the various kinds of twitches to appear in the sward in varying amounts. Summer fallowing affords an opportunity of cleaning the land of twitch not only for wheat but also for any subsequent crops. Cross skimming may even be adopted if twitch is fairly prevalent.

Instead of skimming, the ground may be surface worked with cultivators and harrows before deep ploughing. Beside serving as a means of cleaning the land, summer fallowing of the ground with intermittent cultivation gives the turf plenty of opportunity to decay, and when the land is eventually deep ploughed an excellent tilth usually results. Where the presence of stones makes skimming difficult it is usual, provided twitch is absent, to sow the wheat in one furrow.

Wheat is usually harvested during late January and February. Where wheat follows wheat, therefore, there is usually insufficient time to rot the stubble, and it is customary to burn the stubble and deep plough only. Similarly, after peas, rape, or flax, provided the land is clean, it is not usual to do any preliminary surface cultivation before deep ploughing.

The kind of implements used in the preparation of land for wheat varies according to soil conditions, climate, and the individual ideas of the farmer. Many soils throughout Canterbury contain stones, and here the cultivator and hustler are largely used. In other wheat-growing districts disc harrows frequently replace the cultivator.

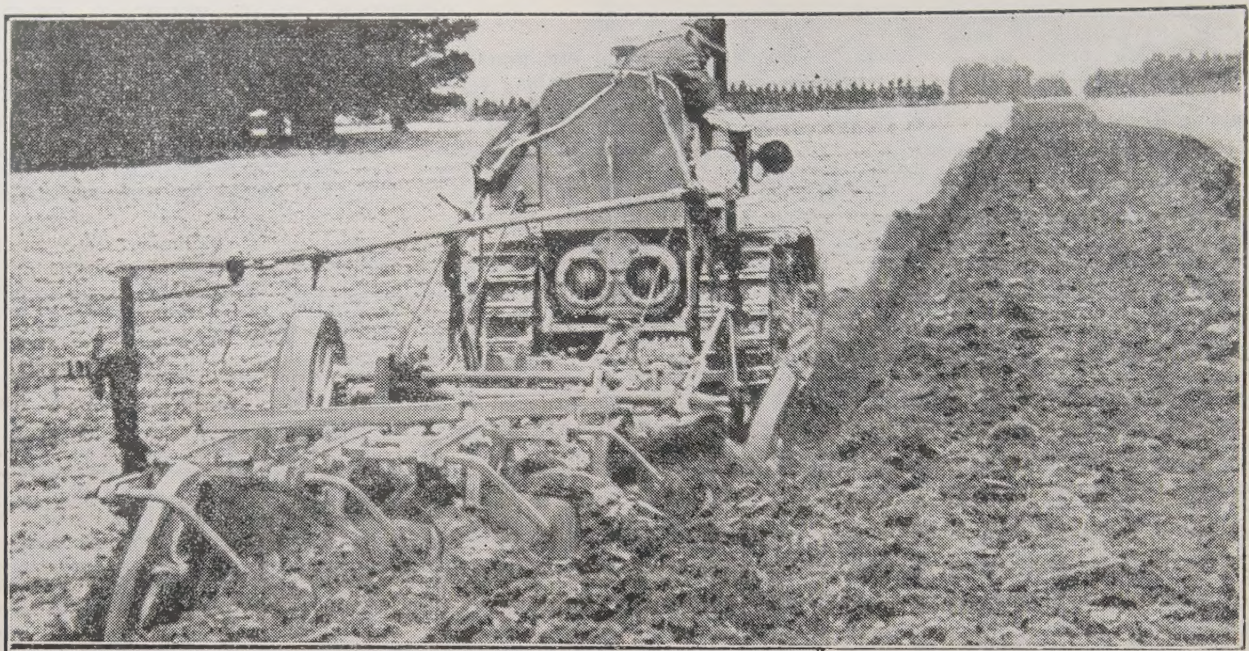
**Whatever the method of cultivation adopted, the final aim, for autumn-sown wheat particularly, should be to have a good depth of cultivation with a fine soil underneath and the surface moderately rough or cloddy. If the surface is left too fine, winter rains are liable to cake the ground, and the wheat may then develop an unthrifty appearance in the spring.**

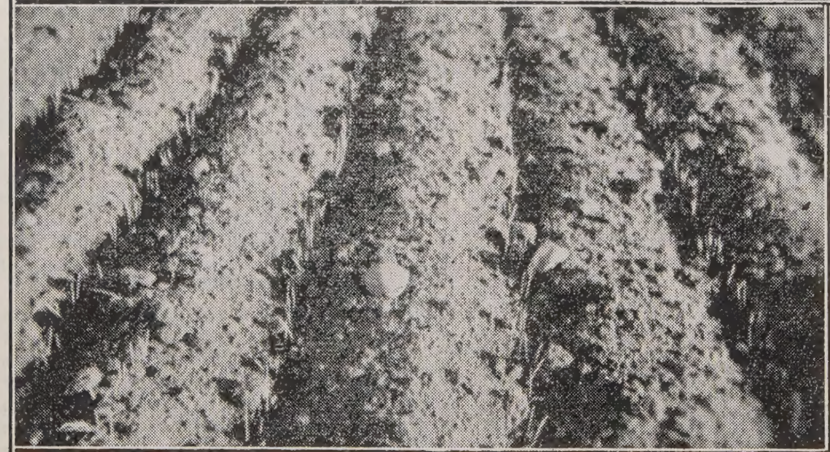
## Time of Sowing

Wheat is either autumn or spring sown, although such references to the recognised times of sowing do not comply strictly with the generally-accepted limits of these seasons. Wheat sown during April, May, or June is usually referred to as autumn wheat and that sown during August and September as spring wheat.

**When seasonal conditions permit farmers try to sow the bulk of their wheat in May and June, as experience over a great many years has shown that wheat sown during these two months will in most cases and in most districts outyield wheat sown at any other period. Wheat sown in May and June does not usually make much growth during the winter, but it gradually develops a good rooting system so that with warmer conditions in the spring tillering is promoted and growth is inclined to shoot fairly rapidly. Moreover, should a dry spell occur in the later stages of growth, the extensive rooting system developed throughout the long growing period enables the wheat to withstand it much better than spring-sown wheat.**

When wheat is sown in the spring success is largely dependent on an adequate rainfall during the critical months of November and December. For this reason spring sowing of wheat is usually resorted to only when autumn sowings have been made impossible by weather conditions or some other factor. Wheat has



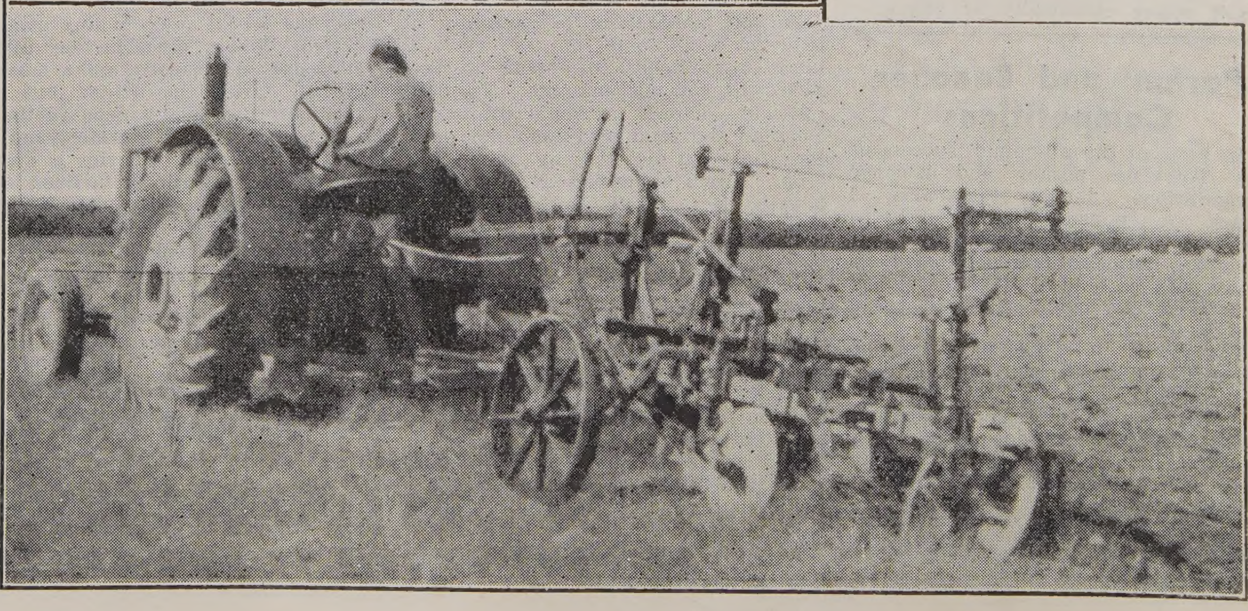


## PREPARATION OF SEED-BED AND SOWING OF WHEAT

Above—Deep ploughing for wheat in the Methven district.

Left—Wheat drilled without subsequent harrowing. The back coulters have completely obliterated the marks of the front coulters.

Below — Skim ploughing grassland for wheat.



generally to be spring sown after turnips and after potatoes, unless these are dug early. Spring sowing of wheat is confined mostly to areas of good land, and districts with a relatively high rainfall offer the best promise of success. The lighter plains land of Canterbury, where 20 to 30 bushels an acre is an average yield, is not suited to spring sowings of wheat.

## Seeding for Wheat

The type of soil, the time of sowing, and the quality of the grain are the three principal factors which influence the seeding rate per acre. On the medium and good wheat land of Canterbury the seeding rate for autumn wheat usually varies between 1½ bushels and 2 bushels per acre, the heavier seeding being used mainly nearer the hills, where there is a higher rainfall. On the lighter and drier soils a seeding rate between 1¼ and 1½ bushels per acre is common. As wheat sown in the spring has not the opportunity to tiller to the same extent as autumn-sown wheat, heavier sowings are the rule with spring wheat, 2 bushels to 2¼ bushels per acre usually being sown.

The quality of the grain also affects the seeding rate per acre. Seed wheat which has been slightly sprouted or which contains chipped or broken grain needs to be sown at a heavier rate than well-developed wheat which has been machine dressed. The Department of Agriculture instituted a scheme some years ago for the certification of all the more important varieties of wheat grown in New Zealand. This enables growers to obtain lines for sowing which are relatively free from diseases and foreign varieties.

## Manuring of Wheat

During the past 20 years a large number of wheat-manuring experiments has been conducted by the Department of Agriculture in the main wheat-growing areas of the Dominion, but more particularly in Canterbury. The results of these comprehensive trials may be summarised as follows:—

(a) An application of 1cwt. of superphosphate increased the average yield by 4.1 bushels per acre.

(b) An application of 1cwt. of serpentine superphosphate gave a result equivalent to 1cwt. of superphosphate.

(c) Other forms of phosphate such as ephos, Nauru, and basic superphosphate gave a result inferior to either superphosphate or serpentine superphosphate.

(d) Increasing the superphosphate application from 1cwt. to 2cwt. per acre resulted in an average yield increase of only 0.2 bushels per acre. The larger application cannot, therefore, be recommended.

(e) The use of potash in association with superphosphate did not prove profitable.

(f) The use of carbonate of lime with superphosphate gave indifferent results, and the use of the mixture could not be generally recommended.

(g) The use of a nitrogenous manure, such as sulphate of ammonia, could not be generally recommended, although an application of 1cwt. per acre in the spring may be profitable with crops having a yellow and unthrifty appearance and showing general symptoms of nitrogen starvation.

**The manuring of wheat in New Zealand today is based very largely on the results of the trials mentioned. Most farmers drill 1cwt. of superphosphate or 1cwt. of serpentine superphosphate per acre down the coulters when sowing their crops. An increase of 4 bushels per acre as a result of using either of these phosphatic fertilisers would not only be profitable to the farmer, but, based on an average sowing of 250,000 acres, it would also represent an increase in the Dominion's total of about 1,000,000 bushels annually.**

## After Cultivation

The treatment the wheat crop receives after drilling is influenced largely by the variety sown, the soil type, and the kind of weather experienced during the winter. In a normal season the majority of farmers would harrow their crops once with tine harrows—usually in September—and then follow immediately with the Cambridge roller. The object of the harrowing is to break any surface crust which may have formed as a result of winter rains. The rolling breaks any clods still remaining, packs the fine soil around the young wheat plants, and provides a smoother surface for harvesting operations, particularly on stony ground.

During a mild winter with very little rain the soil may remain open and friable, and harrowing would then be necessary only to kill weeds. With a very wet winter, however, the reverse is often the case, especially on a clayey soil. The soil may pack down very hard and become so consolidated that it is extremely difficult to provide a surface tilth. In some cases crops may be harrowed two or three times, or the grain drill with the coulters down may be used in an endeavour to provide a surface tilth.

It is a common practice in Canterbury to sow down to grass in a wheat crop. The grass and clover mixture is either drilled or broadcast in the spring either before harrowing and rolling or between harrowing and rolling.

## Grazing of Wheat

Farmers sometimes graze their wheat in the spring because of a shortage of sheep feed, but wheat is generally grazed with sheep only in certain districts and then only in seasons when there appears a danger of the wheat growing very rank and eventually lodging. Lodging makes harvesting operations more difficult; wheat which grows rank is also prone to develop mildew, and badly-mildewed wheat usually means a poor-quality grain. The greatly increased sowings in recent years of the short-strawed Cross 7 variety no doubt explain why there has been a considerable reduction in the acreage of longer-strawed wheat it has been necessary to graze because of rank growth.

Grazing is probably practised most frequently in areas of very good land of the sandy loam type. On the heavier clay type of soil grazing is less frequent, as the trampling of the sheep tends to encourage cracking of the ground should a dry spell occur.

The use of a large mob of sheep to obtain rapid and even grazing is recognised as the best method of grazing wheat. Probably more farmers would graze wheat if they had large enough flocks to graze it off quickly and evenly.

Sacks of wheat as dropped in the harvest field by the header harvester.

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March 1—Matamata A. and P. at Matamata.
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March 1—Waimarino A. and P. at Raetihi.
March 1—Albany Fruitgrowers Association at Albany.
March 1—Maniototo A. and P. at Ranfurly.
March 5—Morrinsville A. and P. at Morrinsville.
March 8—Kumeu District Ag. and Hort. at Kumeu.
March 12—Lake County A. and P. at Arrowtown.
March 14, 15—Waikato Central A. and P. at Cambridge.
March 15—Hawke's Bay A. and P. at Napier.
March 15—Mayfield A. and P. at Mayfield.
March 15—Wellsford A. and P. at Wellsford.
March 25—Waimate A. and P. at Waimate.
March 29—Hawarden A. and P. at Hawarden.
March 29—Methven A. and P. at Methven.
March 29—Waverley A. and P. at Waverley.
April 7—Mackenzie Country Highland Show at Fairlie.
April 7—Strath Taieri at Middlemarch.
April 12—Oxford A. and P. at Oxford.

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## Fungous Diseases

**Bunt, Ball Smut, or Stinking Smut.**—This disease develops into balls of smut in place of the grain. These balls do not break up unless crushed or broken during threshing. The disease produces a distinctive fishy smell which can be readily detected in a sample of grain, as compared with loose smut, which cannot be detected by smell.

Contamination of the grain is usually made during threshing, when the spores of the broken smut balls stick to the healthy seed, usually in the crack of the grain or in the hairy end of it. Since the spores of ball smut are carried on the surface of the grain, this disease can be controlled by pickling or dusting of the grain.

The old wet pickles using bluestone or formalin were efficient methods of controlling the disease, but they had the disadvantage that the germination of the seed was very often adversely affected. The wet method has now been replaced by dry dusting of wheat, using mainly mercuric dusts. The obvious advantages of dry dusting over the wet pickles are that it is easier to apply, dry dusted seed is more convenient to drill, and the dusting of the seed can be done at any time between harvest and sowing. Mercuric dusts are used at the rate of 2oz. per bushel. Nowadays most of the stationary and portable seed-dressing plants are fitted with dusting machines which perform the dressing and dusting of the grain in one operation. Some farmers dust their own seed. For this purpose a 40-gallon oil drum operated on a somewhat similar principle to a concrete mixer is generally used.

**Loose Smut.**—Another fungus disease of wheat, loose smut may be seen in crops after the head has emerged from the shot blade. The smut develops in place of the grain, forming a black powdery mass (the spores of the smut) which is blown away by the wind. In a ripe wheat crop heads affected with loose smut can be found well below the level of the filled heads. Affected heads are bare, with no grain or chaff, and of a dark colour.

## Young Farmers' Clubs Movement

**A SPECIAL Young Farmers' Clubs Supplement published monthly and issued with the "Journal of Agriculture" to all active members of Young Farmers' Clubs contains reports of Y.F.C. activities, including monthly meetings of clubs and articles and news of value to members. Other persons interested, provided they are subscribers to the "Journal," may obtain copies of the supplement, post free, on application to the Dominion Secretary, N.Z. Federation of Young Farmers' Clubs (Inc.), P.O. Box 3004, Wellington.**

Threshing wheat out of stook. The old-fashioned traction engine supplies the power.

Some of the spores that are blown away land on healthy developing grain, germinate, and enter the grain, to stay there until that grain is in turn sown.

There is no reliable treatment that can be carried out on the farm to control loose smut. The disease may be controlled by immersion of the grain in hot water, but the difficulty of the hot water treatment is that the difference between the temperature required to kill the smut and the temperature that will kill the wheat germ is small, and great care is required while treating the wheat to ensure the killing of the smut without killing the germ.

**Farmers should endeavour to buy seed from a crop raised from hot water-treated seed, or from a crop that is known to be free, or nearly free, from loose smut. The use of Government Certified seed will ensure that the resultant crop is practically free from loose smut. Some varieties such as Hunters appear to be immune from loose smut, while Tuscan and Fife Tuscan are not very susceptible to it; Cross 7, on the other hand, appears to be rather susceptible.**

**Take All.**—This can be a very serious disease of wheat, although it appears to be affected by seasonal conditions; some years there may be very little, while in other years patches of it will show up fairly extensively.

Take all is a fungoid disease which attacks plants at and below ground level, and the presence of the fungus causes a blackening of the base of the stems. The disease has a tendency to occur in crops in more or less circular patches. Near the centre of affected areas the plants may die before the ears appear. Even if flowering does take place, however, affected heads will contain no grain or only partially-developed grain. The disease is also reported as occurring in barley and barley grass, and it may occur in other grasses.

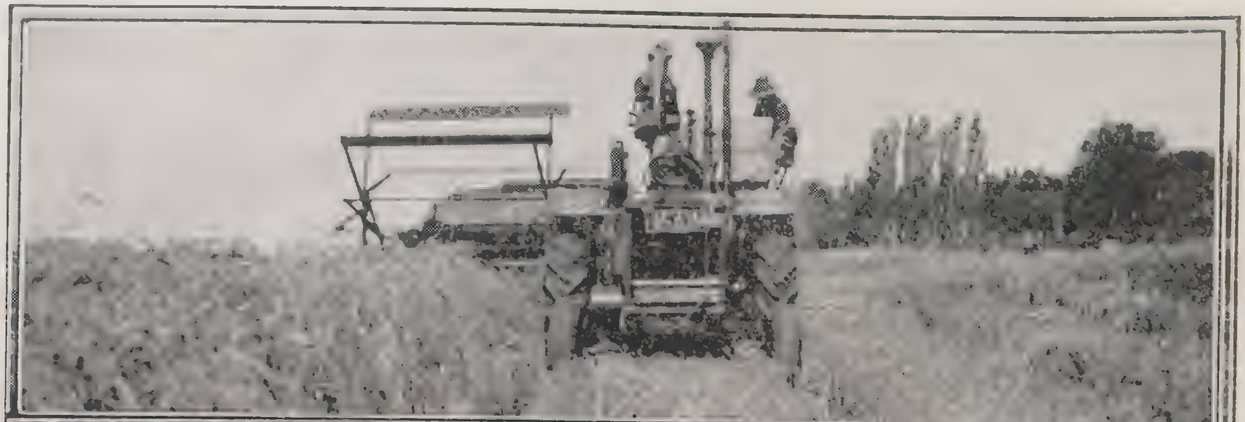
Once the disease appears in a crop nothing can be done to control it. The infection can apparently survive in the ground for some years. Control measures can be best applied by not sowing a second wheat crop for, say, five years in a field that has been affected with take all. When sowing wheat after grass, a rape crop, or at least a good fallow before sowing, assists in eliminating take all infection which may have been carried over on the grass.

Grain from a diseased crop should not be used for seed. Burning of diseased straw will also assist in controlling the disease.

**Mildew.**—This disease appears as a whitish mould on the leaves of affected plants. Usually the mould appears on the upper surface of the leaf, but if the attack is a severe one, it may extend to the lower side and also to the sheaths and stems. Mildew is most prevalent in rank crops, and particularly in damp and muggy seasons. Thick seedlings are recognised as a predisposing cause of mildew. In some localities wheat is grazed in the spring to reduce the leafage and render the crops less susceptible to later attack by mildew.

**Rust.**—There are two kinds of rust found in wheat—leaf rust and stem rust. Leaf rust occurs in most crops in varying degrees every year, but the total damage it causes would be very difficult to assess. In New Zealand it

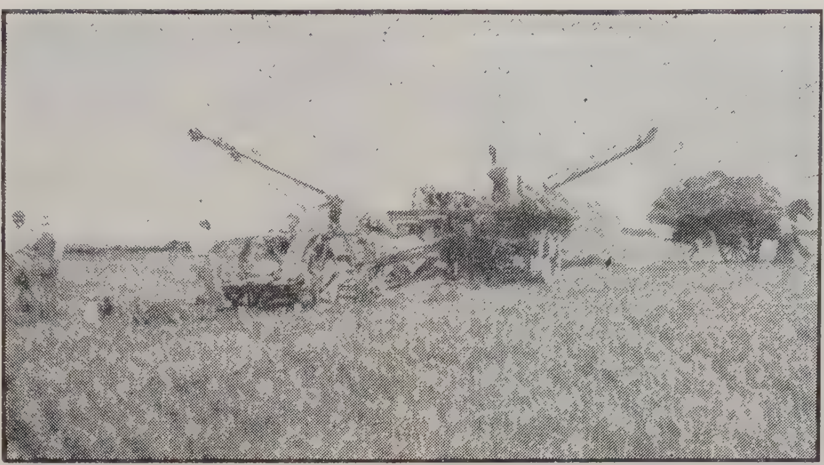
# HARVESTING THE WHEAT CROP



Above—Direct heading a heavy crop of wheat in the Wakanui district.

Left—Crop of Hunters wheat in stook.

Below—Threshing a crop of wheat with an auto header.



A threshing mill operated by an electrically-driven tractor.

is not considered of any great economic importance.

In most seasons if stem rust occurs at all, it is present only to a slight extent in the wheat crop. Occasionally, however, severe infection may occur in individual crops, usually crops which are very late sown in a season with damp, muggy weather just before harvesting.

There is no method so far known of treating either the seed or the crop to control rust. Control would appear to be along the lines of breeding rust-resistant strains.

**Root Rot.**—This is caused by *Fusarium*, a weak parasitic soil fungus which may attack and kill wheat plants from the seedling stage to the flowering stage. The fungus attacks the rooting system of the plant and the basal portion of the stem. If plants are attacked in the early stages of growth, the disease is known as "seedling blight." Severely-affected plants wilt and die, but only very occasionally is the damage sufficient to necessitate the crop being ploughed up. If the disease causes only a check in growth, the plants may assume a stunted yellow appearance in the spring—a condition known as "spring yellows." Infection at or near flowering time produces a bleached and sterile head commonly referred to as "white heads."

There are no known methods of control of the disease. Stimulation of the growth by efficient cultivation, good drainage where necessary, and not drilling too deeply offer the best means of prevention.

**Eye Spot.**—This disease is caused by a fungus which attacks the lower portion of the stem of the wheat plant, producing brown areas which are frequently elliptic, giving rise to the name eye spot. The effect of the fungus is to weaken the straw, so that should a high wind occur near flowering time, a badly-affected crop may collapse. A partially-affected crop presents a tangled appearance, lodged straws being mixed with upright ones. In addition, when the straws become lodged the flow of sap to the head of the plant is partly arrested, with the result that the grain may be somewhat pinched.

Eye spot was first recorded in New Zealand in the 1942-43 season, when a disastrous outbreak occurred in the Taieri district of Otago. It has also been recorded as occurring in other districts in New Zealand, but only to a minor extent.

The mode of transmission of eye spot has not been completely determined. Initial infection of an area may take place through the seed, or it may be introduced to an area with infected straw or by harvesting machinery. There is a suggestion that the fungus builds up on an area. A field showing slight infection one year may show severe infection the following year if the paddock is again sown in wheat.

There is no evidence to support the view that any one variety of wheat is more susceptible to eye spot than another.

Harvesting wheat plots at the Wheat Research Institute, Lincoln, whose experiments provide data of great value to the wheat grower[illegible]

**Refraining from using seed from an infected crop, burning of stubble of infected crops, practising a wide wheat rotation, and avoiding the distribution of infected straw are precautionary measures which are recommended in areas subject to eye spot.**

## Insect and Other Pests

**Hessian Fly.**—This insect, which attacks barley as well as wheat, was introduced into New Zealand about 1870. It is present in varying amounts in most wheat crops every year. In some wheat-growing areas it is the cause of considerable loss annually, while in other areas the damage it causes is not considered great.

A detailed study of the life cycle of the hessian fly has not yet been carried out under New Zealand conditions. In the spring the adult fly lays eggs on the leaves of the wheat plant. The maggot which hatches out crawls down between the stem and the leaf sheath, feeding as it goes, and usually comes to rest about the second node from the ground, but in some cases actually below ground level. At the node where it comes to rest it completes its feeding, and then turns to a pupa. Because of the colour and shape, the pupal stage of the insect is often referred to as the "flax seed" stage. The insect winters in the stubble in the pupal form, and emerges as the adult fly in the spring to attack the new crop.

Plants attacked early by hessian fly may produce a poorly-developed ear. At the point where the pupa rests the stem is nearly always indented and weakened, and hessian fly infestation may lead to much straw break during high winds. Affected crops are reduced in yield and harvesting may be made more difficult.

Of the more common varieties of wheat grown, Tuscan appears the least susceptible to attack by hessian fly; Hunters, Dreadnought, and Cross 7 seem to suffer most. In Tuscan it is unusual to find more than one "flax seed" on each stem, but the "flax seeds" frequently occur in twos and threes on Hunters, Dreadnought, and Cross 7.

**As the hessian fly overwinters in the "flax seed" stage in wheat straw and wheat stubble, destruction of the straw by burning seems the best means of control. Deep ploughing of wheat stubble would also reduce the number of pupae which may develop into the mature insect in the spring. The general practice throughout Canterbury of sowing down to grass in the wheat crop undoubtedly assists in perpetuating this menace.**

**Wheat Bug.**—In certain localities in New Zealand the developing wheat grain is sometimes attacked by bugs which suck the sap from the grain and at the same time inject into the grain something which apparently causes the gluten to change so that satisfactory bread cannot be made. The condition is known as "sticky dough" or "slimy gluten."

In New Zealand there are three species of insects which attack the wheat grain and produce this "slimy gluten" condition. However, the fact that two of the insects are natives to be found in most pastures and that the damage annually is considered of minor importance suggests that it is only under exceptional circumstances that the bugs attack wheat.

There is no known means of control.

**Stem Weevil.**—Introduced from the Argentine, stem weevil was first recorded as being present in New Zealand in 1927, but it was not until about 1933 that it was associated with damage to wheat.

During the winter the insect remains in the soil in the adult stage. In October it lays its eggs on the wheat plant and the small white grubs which develop begin to bore into the stem of the plant. If the plants attacked are very young—this applies particularly to spring-sown wheat — the grub usually bores down the centre of the succulent stem and the destruction of plants or tillers it causes in this way may be sufficient to result in a thin crop. When the wheat is attacked at a later stage of growth the grubs usually concentrate on one of the lower nodes of the stem and create a weakness in the straw at this point. Toward harvest the weakened straw readily succumbs to high winds. A great deal of straw break in crops in midsummer which is regarded as wind damage is primarily due to earlier infestation of the crop by this weevil. The weevil also attacks barley and ryegrass.

There are no methods of control of this insect.

**Grass-grub.**—The grass-grub, which is a native of New Zealand, is responsible for damage to wheat crops every year, and sometimes the damage has been sufficient to necessitate resowing. Usually, however, it is confined to patches in crops or it may cause some thinning out of the whole crop. Evidence of grub attack is first noticed about May, and damage may continue until early in October. Crops which show grub damage are usually rolled to pack the soil around the roots of the wheat and encourage the development of new roots.

**Slugs.**—Occasionally wheat crops are attacked by slugs, usually where the wheat follows a pea crop. The slugs feed on the leaves, usually when the wheat is 3 or 4in. high. If the attack is a severe one and the leaves are badly damaged, it may be advisable to plough up the crop.

### Harvesting

Perhaps no phase of wheat production in New Zealand has undergone such a revolutionary change as the methods of harvesting. Before 1930 all the wheat grown was cut with the binder and stooked. It was then either threshed from the stook, or, if a mill was not available, it was stacked and later threshed from the stack. In 1930 two header harvesters were tried out on wheat. Eight seasons later the number had increased to 300, and these threshed about 35 per cent. of the total wheat grown. Today probably 90 per cent. of wheat grown in Canterbury is threshed with header harvesters either by direct heading or by the windrow method. Varieties such as Tuscan, Fife Tuscan, and Cross 7 are generally direct headed, while varieties which tend to shake readily, such as Jumbuck, Dreadnought, and Marquis, may be windrowed and threshed from the windrow, or they may be stook threshed. Because of its valuable straw, Hunters is usually cut with the binder and threshed from the stook.

In some wheat-growing areas where the climate seems unsuitable for header harvesters to operate satisfactorily it is still a common practice to thresh from the stack.

When crops are threshed with header harvesters the sacks of wheat are usually left in the paddock until they are collected by motor lorry and transported either to flour mills or grain stores. Should rain intervene before the wheat is collected, it may be necessary to turn the sacks at intervals to prevent undue sprouting.

### Conclusion

In many of the larger wheat-producing countries of the world, such as Canada, India, and Australia, the wheat crop is grown on the poorer and drier soil types and yields generally vary between 10 and 20 bushels per acre. In New Zealand it is the heavier, more fertile soils in the wheat-growing areas which are looked upon as ideal for wheat, although a proportion of the wheat crop is also grown on the poorer soil types or on what is commonly referred to as marginal wheat land. On the good wheat land yields of 60 bushels per acre are not uncommon, and few farmers would sow wheat on land where the yield would be likely to fall below 20 bushels per acre.

## Preparations for Wintering Stock

At this time of the year the aim should be to reduce the stock on the farm to the number which can be wintered in reasonable condition. An attempt should be made to finish off stock which are culled from the breeding flock or herd before winter begins, and sufficient selected breeding stock should be kept to maintain or if possible increase production next season.

**Dairy herd.**—By now milk production will be declining and dairy cows for culling should be dried off and disposed of. Calves should continue to graze around the farm ahead of the milking cows.

**Pigs.**—An attempt should be made to finish off all pigs, except breeding stock and those which it is estimated can be wintered reasonably well, by feeding such crops as green maize, carrots, and marrows to supplement dwindling supplies of separated milk.

**Sheep flock.**—Cull ewes should be finally disposed of, as well as all cull lambs and other dry stock which cannot be wintered. Replacements of breeding ewes should be made. On most farms the aim will be to enter the winter with breeding stock only. Ewes should be finished two weeks before tupping, using any second-growth rape, greenfeed, or young growth of grain for the purpose. Dipping should take place at least two weeks before tupping and both ewes and rams should be dagged before the rams go out. During tupping "box" the breeding flock frequently.

# *Aims of United Nations Food & Agriculture Organisation*

**By J. V. WHITE, *Rural Development Division, Wellington.***

**TO many people the letters FAO may mean nothing more than another of those rather irritating combinations of initial letters which appear in profusion in the daily papers and other publications. Nevertheless, in view of the Dominion's predominantly agricultural economy, those initials, standing for the Food and Agriculture Organisation of the United Nations, are of considerable interest to New Zealanders in general and the farming community in particular. Also of particular interest is the fact that the Director-General of Agriculture, Mr. E. J. Fawcett, is a member of FAO's executive committee and was one of the three vice-chairmen of the conference held last year at Copenhagen. FAO came into being as an agency of the United Nations, being, in fact, the first of the permanent United Nations organisations, but it had its genesis in the minds of many of the world's agricultural economists and nutritionists some years before the war.**

TO understand and appreciate fully the aims and scope of FAO it is necessary to have some knowledge of the development of agriculture in relation to the growth of population during the past century or so. For convenience most of Europe and the Americas, Australia, South Africa, and New Zealand may be termed the Western World and the rest of the sphere the Eastern World.

Between 1830 and 1930 the production of food in the Western World expanded prodigiously because of the application of science to farming, improvements in the system of land tenure, and, above all, the opening up of the New World (the Americas, Africa, New Zealand, and Australia), which increased manyfold what may be termed Europe's food catchment area. It is true that population trebled and perhaps even quadrupled during the same period, but agricultural production increased even faster and by 1930 consumption a head was greater in quantity and better in quality than it was in 1830.

## Twentieth Century Trend

During the twentieth century, however, new trends set in. The rate of population growth slowed down and the production capacity of farming under existing trading conditions became more than adequate for requirements. In the economic sphere there developed in the 1920's the phenomenon of trade barriers—tariffs, which were a product of post-war economic maladjustments and the all-pervading spirit of economic nationalism. Food exporting countries of the New World imposed tariffs to build up infant manufacturing industries, at the same time expecting the older manufacturing countries to absorb their surplus agricultural produce. In 1929 came the "slump," which intensified the practice of dumping and caused tariff walls to be built even higher.

**Finally there arose the anomalous position of the 1930's when there was enormous unused capacity to produce food, and, in some cases, considerable unused production on the one hand and unemployment and poverty on the other. Thus arose the catchcry of the 1930's "poverty amid plenty," a cliche which, if not strictly accurate, had some solid foundation in fact.**

This phenomenon of poverty amid plenty, however, applied at most to only one-third of the world's two thousand million inhabitants. The other two-thirds, the inhabitants, of the Eastern World, experienced no crisis and, in fact, no agricultural revolution at all comparable with that of the Western World. The bulk of its population are subsistence farmers—that is, the food consumers are the food producers—and in consequence there is no complex market and financial system to get out of gear. The birth rate had been and still is extraordinarily high, but famine and disease have resulted in a very slow ncrease in population, though there has been some increase, with which the food output has barely kept pace. Poverty is rife and will undoubtedly continue while the agricultural technique continues to be dominated by superstition and ignorance.

That, in brief, was the world agricultural situation before 1939, and though the war has brought the problem to the light of criticism much sooner and with much greater clarity than would otherwise have been the case, and has replaced temporarily a condition of extensive food surpluses by one of even vaster food deficits, the whole question of the production and distribution of the world's food supply has been in the minds of many of the world's thinkers for a long time.

Mr. E. J. Fawcett.

## Earlier Organisation

FAO cannot be claimed as the first organisation of its kind. In 1905 there was founded at Rome the International Institute of Agriculture (I.I.A.), the result of a convention between the representatives of 40 countries. That organisation, which by 1930 had representatives from 74 countries, may be regarded as the pioneer of official international institutions, but it confined its activities to the internationl sphere and its essential objects were much narrower in concept and scope than those of FAO. They may be summarised as follows: "To collect, examine, and publish statistical, technical, and economic information about all phases of farming, including such things as trade in agricultural products, prices, wages paid for farm work, the recording of new diseases of crops and stock and, where possible, effective measures for their control; to study problems of agricultural credit and co-operation and publish available information; and, should occasion arise, to submit for the approval of the various Governments measures for the protection of the common interests of farmers and the improvement of their conditions."

Thus, the I.I.A. did not envisage dealing with the huge problems of overproduction in the Western World and the raising of nutritional standards over the greater part of the Eastern World.

# FOOD AND AGRICULTURE ORGANISATION . . .

The I.I.A. was taken over by FAO on August 1, 1946. The employees of the institute will be placed on the temporary staff of FAO and the institute's comprehensive library of statistical data and technical information will prove a valuable asset.

## Development of FAO

Just as it is almost impossible to deal with the food problems of any one State in isolation, so it is almost as difficult to regard the machinery set up to deal with international food problems without mentioning the background of the new international machinery of which it is a part.

The United Nations came into being on October 24, 1945, when the first 29 of the 51 United Nations had ratified the charter which was formulated at the San Francisco conference the previous spring. This new international structure is, in reality, composed of a number of functional or specialised agencies which are international and permanent. The General Assembly of UN, on which each of the member States is represented, elects 18 members who form the Economic and Social Council, which enters into agreement with specialised agencies on the economic, social, cultural, health, and related fields.

FAO was the first of these new functional bodies, coming into existence on October 16, 1945, thus preceding its "mother" organisation UN by eight days because international organisations are, by constitution, deemed to be set up when a certain number of States have ratified the decisions of their Government representatives.

In addition to FAO there is the International Monetary Fund and Reconstruction Bank, which came into existence on December 27, 1945, as a result of the Bretton Woods agreement, the International Civil Aviation Organisation, the United Nations Educational, Scientific, and Cultural Organisation, the United Nations Health Organisation, and a number of temporary organisations set up to deal with situations arising out of the war, chief among them being UNRRA.

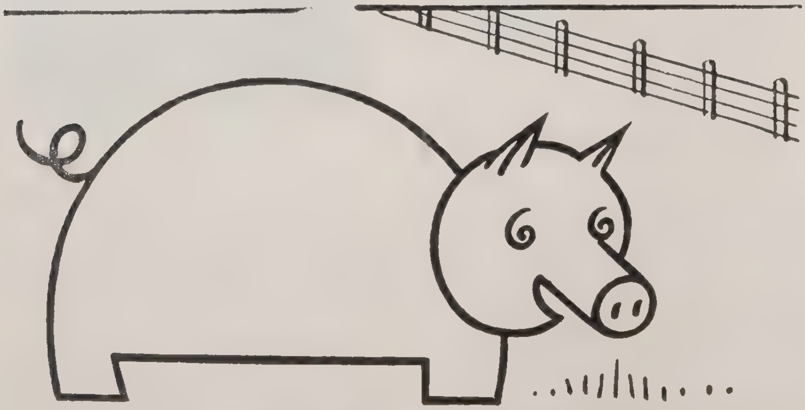
## Hot Springs and Quebec Conferences

**It is clear that problems of food and agriculture, currency and finance, trade and labour, and health and nutrition are all closely interlinked, and the general plan is to co-ordinate the activities of agencies for the fulfilment of President Roosevelt's third freedom—freedom from want. It was with the object of fulfilling this great aspiration that the conference was called by the President at Hot Springs, Virginia, from May 18 to June 3, 1943.**

This conference stated that two-thirds of mankind suffered from malnutrition, including a proportion of even the advanced countries, and as causes of this state of affairs it advanced the following:—

1. Insufficient purchasing power;
2. Inadequate supplies of satisfactory foodstuffs at reasonable prices; and
3. Ignorance among the public and administrators on nutritional problems.

An interim commission was set up, one of its main functions being to formulate a specific plan for a permanent organisation in the field of food and agriculture. This commission, working in Washington, drafted a constitution and produced a number of reports describing the field of work of the proposed Food and Agriculture Organisation. After acceptance of the constitution had been signified by at least 20 Governments, the interim commission was able to call the first conference of the permanent organisation. In the two years between the Hot Springs and Quebec conferences the commission, with the assistance of the Governments of practically all the allied nations, did an immense amount of preparatory work, entailing not only the preparation of a constitution but also preliminary studies of food and agriculture resources in various countries and similar studies in the field of nutrition and consumption requirements. A number of reports was issued, among them the handbook "The Work of FAO," compiled for the guidance of representatives to the first conference.



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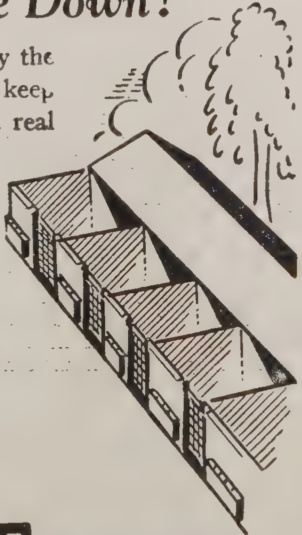

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At the conference held in Quebec in October, 1945, the representatives, after signing FAO's constitution, went on to give the new agency form and substance. They elected as first director-general Sir John Boyd Orr, an eminent Scotsman known the world over for his research work in animal and human nutrition, and who owns and has operated a large general farm in Scotland. They appointed an executive committee of 15 which chose Professor André Mayer (France) as chairman and Mr. Howard R. Tolley (U.S.A.) as vice-chairman. Finally they adopted rules of procedure, financial regulations, and a budget which provided for 5,000,000 dollars for the first full financial year.

## Summary of Objectives

The constitution of FAO is in considerable detail, but its main objectives may be summarised as follows:—

1. To establish, by surveys, research, and collection of statistical data and other information, the proper dietary needs of the people of the world, and to provide all member nations at all times with a true and complete picture of the food situation in every land.
2. To endeavour to have the production of food in all countries co-related to the nutritional needs of the world's population to the end that eventually there shall be enough of the right kind of food for everyone everywhere.
3. To promote in all possible ways the scientific development of agricultural production and to disseminate information and provide technical services to the Governments to that end.
4. To assist in organising the world's marketing and distribution machinery for the handling of food and other agricultural products on a world basis in such a way as to ensure the delivery of these products to the people who need them in the most equitable manner, in the quickest and most effective way, and at the lowest price economically possible: That is, a price which will ensure the producer of these products a return commensurate with the costs of production, the maintenance of his production unit, and the enjoyment of a proper standard of living for himself, his family and his workers.

**The scope of FAO is much wider than the words of its title indicate and includes fisheries, because of the food and fertilising value of fish and other sea products, and forests, because of their importance in providing shelter and fulfilling the multitude of other purposes for which timber is essential.**

## Accomplishments in First Year

FAO has been in existence for a little more than 12 months and it is reasonable to enquire what has been achieved in that period. It must be borne in mind that FAO is essentially a permanent organisation with long-term objectives, but what it has accomplished in the past year gives more than a little indication of what may be expected in the future.

**World food survey:** The headquarters of FAO is in Washington, D.C., and was established as soon as possible after the Quebec conference. The first work undertaken was the preparation of a world food survey which included pre-war figures of the consumption and production of food, practical food consumption "targets," estimates of the increases or changes required to reach those targets, estimates of dislocation in consumption and production brought about by the war, and a forecast of what the consumption and production picture may be during the next few years. Similar world figures, as far as possible, are to be compiled for fish and forest products and for fertilisers. This survey was published in July, 1946, and in view of the difficulties of obtaining accurate statistical information at such short notice it is remarkably thorough and comprehensive, consisting of figures and other data from 70 countries.

New Zealand and Denmark have been selected as examples of countries where food is abundant, purchasing power high, and, as a result, the diet more or less fully adequate for health; in contrast, the Dominican Republic and Java have been selected as representative of countries where the opposite conditions obtain and the standard of nutrition is extremely poor.

**National committees:** To provide points of contact in the member countries FAO has recommended the establishment in each country of committees of representatives of Government Departments and farmer and consumer organisations dealing with food, agriculture, health, forestry, etc.

**Genetic clearing house:** One of the first requests made to FAO was that it establish an international centre for genetic stocks or plant-breeding material. It is proposed to maintain a catalogue of all plant-breeding stocks available in public institutions throughout the world with descriptive notes giving characteristics of each variety or strain and telling where it is available. Any plant breeder would then know where to obtain material with the characteristics desired for a given breeding programme. This has been described by the director-general as the first experimental step toward what may develop into a considerable range of similar services by FAO.

**Mission to Greece:** Soon after the Quebec conference the Government of Greece asked FAO to send a group to study the country's agriculture and fisheries from a broad standpoint with a view to recommending comprehensive, long-term developments that would fit into the whole national economy. Greece was particularly in need of such assistance, and FAO enlisted the services of a group of experts from the U.S.A., Britain, and France whose fields of work covered all branches of agricultural and pastoral production and the processing of products. As Sir John Boyd Orr said: "The object is not to suggest a little patchwork improvement here and there, but to work out long-term plans for the development of Greek agriculture and fisheries, including the necessary facilities for research and education—plans that take fully into account the natural resources and handicaps of the country, and which can be geared into the national economy as a whole." The experience gained by this mission will be invaluable in similar work in the future. The mission had its preliminary report ready for the Copenhagen conference. It made definite recommendations and estimated the finance required to carry them out, which will form the basis of recommendations made by FAO to the International Bank.

## World Food Crisis

FAO is essentially an organisation dealing with long-term food and agricultural policy and for that reason did not intend to deal actively with the present food emergency. Hence, when early in February the United Nations General Assembly called on FAO for assistance to deal with the food crisis which was looming as a result of the war and successive bad harvests, and which would be greatly accentuated by the expected termination of the temporary agencies UNRRA, the Combined Food Board, and the Emergency Economic Committee of Europe, it was not without some hesitation that Sir John Boyd Orr agreed to co-operate as far as was within the power of FAO's still somewhat embryonic organisation.

**A special meeting to consider the food crisis, and known as the Special Meeting on Urgent Food Problems, was convened and began on May 20, 1946, in Washington. Among its recommendations were the setting up of the International Emergency Food Council to replace and enlarge the Combined Food Board (U.S.A., Britain, and Canada) to allocate foodstuffs, seeds, and fertilisers on the most equitable basis possible; methods using available supplies to best advantage in an endeavour to**

**bridge the gap (estimated at 10,000,000 metric tons or its equivalent) between the supplies available and those required; and plans for increasing the next year's harvest to meet the needs of 1947-48. Among the items designed to maximise the available food suuplies was a study of the prevention of wastage of food through the depredation of insects, mites, rodents, and mould fungi.**

The International Emergency Food Council began its meetings on June 20. Through the Supply Mission in Washington, New Zealand has representation on several of the committees.

To keep both the general public and those actively interested in FAO's work fully informed of all activities, a number of publications has been issued, one of which, the "Information Service Bulletin," is essentially a news organ intended for wide distribution.

A further conference was held last year at Copenhagen from September 2 to 13, when the general work of the organisation was further advanced.

### Future of Organisation

Even the most sanguine do not expect large-scale significant results from FAO's work for a number of years—in fact, generations will probably pass before some of the hoped-for results will be brought about and the long-range planning of today bears fruition. In the meantime what difficulties will FAO have to face?

A common criticism is that any attempt to balance the overproduction of the Western World against the low living standards of the Eastern World will mean, in effect, that the advanced countries will carry the backward ones on their shoulders—"the white man's burden." This attitude of mind cannot be too strongly deprecated. It is true that FAO will be up against something much more complex than technical problems of increasing the world's food supply, thorny as they may prove: There looms the all-important question of distribution. How can countries such as India and China pay for additional food imports? In part by raw materials and in part by manufactured goods; but if by the latter, it may be questioned whether the food-exporting countries, which are in most cases also extensive manufacturing countries such as U.S.A., Canada, and Australia, will accept manufactured goods which may compete with their own manufactures. And, in the meantime, how will the food-importing countries finance their additional food imports? The answer is, of course, by international credits furnished by the advanced countries through the new international machinery set up for the purpose.

But the backward countries need something more than that: They require assistance to catch up with the Western World in technical progress. That will necessarily involve getting the best technical aid and advice from the advanced countries. In countries where subsistence farming is the rule agricultural efficiency can be improved only by reducing the number of uneconomic small holdings, the surplus rural population being absorbed in the manufacturing and processing industries and in the administrative services which will have to be built up.

### Not Based on Charity

The market for goods which will automatically develop will be enormous. One cannot do better than quote Sir John Boyd Orr's words: "FAO is not based on charity. The responsibility of the advanced nations is not one of charity. It might be nearer the truth to say that it is a matter of survival. Farmers in the highly-developed countries, especially the United States, remember only too well the troubles of the inter-war period with its ruinous prices caused by 'surpluses' of food while half the world lacked bread. The fact is that the great productive capacity given to industry and agriculture by modern science must be put to full use, it must find outlets, or the economic and social system will go to pieces under the strain."

**There are, in the meantime, countless ways in which FAO can be of service to the world. It can do much to procure more speedy application of the findings of science to agriculture, forestry, fisheries, marketing, and food consumption, and it can encourage and facilitate new surveys and new projects of development.**

The world food emergency will probably last to a varying degree for three or four years. Any effective world plan worked out by the nations for dealing with it can be dovetailed with the longer-term undertaking of FAO which looks toward freeing the world from hunger permanently.

# Improved Strain of Timothy Now Available

*By* J. H. CLARIDGE, *Agronomist, Wellington.*

**SUPPLIES of an improved strain of Certified timothy pasture seed are now available in New Zealand. That development assumes added importance in the light of the rapid increase in production of this seed in the Dominion in the past 10 years. Instead of importing up to 100 tons a year, on the basis of the 1946 crop the country has become virtually self-supporting in timothy seed.**

TIMOTHY is one of the few pasture plant seeds which in the past has not been produced in New Zealand in sufficient quantities to meet the country's requirements, and seed has been imported from the United States of America to supplement the relatively small production. It is estimated that during the three years preceding the war 100 tons or a little more of imported seed was sufficient, with the New Zealand crop, to meet domestic needs. During the war the importation of timothy was restricted to bare necessities and the retail market was at times undersupplied. That may explain the big increase in New Zealand production, which has risen from 37 tons (the produce of 380 acres) in the 1936-37 season to 127 tons (from 1086 acres) in the 1945-46 season.

### American Seed Inferior

An observation of the various strains of timothy has shown that the seed imported from America is usually of an inferior type, and Dominion-grown seed has been slightly better. But seed of the S.48 strain of timothy raised by the Welsh Plant Breeding Station at Aberystwyth is vastly superior to any natural strains for fodder production.

Seed of this strain was introduced into this country a few years ago, and has been multiplied under certification until more than 100 acres, averaging 231lb. an acre of machine-dressed seed, were saved for seed last year. Supplies of Certified Standard timothy seed produced from these areas are now on the market, and farmers may with advantage include this seed in pasture mixtures where the species is desired.

**A selection of timothy more adapted to New Zealand conditions than the S.48 strain is at present being multiplied, and when supplies are available seed will be distributed through commercial channels**

By encouraging production of Certified timothy seed it is hoped that importations may be eliminated in favour of superior New Zealand-grown seed. Another aspect that should not be lost sight of is the possibility of developing production until supplies of Certified seed are available for export.

# Choice of Time and Type of Topdressing

INCREASED production on most farms is closely associated with the efficient use of topdressing. Some of the considerations influencing the choice of fertiliser and the time of application are discussed in this article by P. S. Syme, Instructor in Agriculture, Warkworth.

WITH the gradual return to more normal conditions, many farmers are looking forward to the time when something like the pre-war choice of artificial fertilisers will again be available. This wider choice, though it will undoubtedly be welcomed, will pose a problem which may sometimes not be easy to solve. Many farmers have proved to their satisfaction that certain varieties of fertiliser appear to suit the conditions on their farms better than others, but the problem of which to order may be complicated by wide differences in price and uncertainties about deliveries.

## Final Decision with Farmer

As it is impossible to give general advice which will apply to any farm, the final decision must lie with the farmer. However, while admitting the excellent results frequently obtained in the past from such fertilisers as basic slag and North African phosphate on certain soil types, it is probably safe to say that farmers who have been reasonably satisfied with superphosphate or serpentine superphosphate would be wise to continue their use should the price range of imported phosphate appear too wide.

On certain farms where slag, and to a less degree North African phosphate, have proved highly efficient, higher prices might well be justified if steep or inaccessible country makes the transport of large quantities of lime too difficult and costly. Though the response to slag might be improved by liming, slag without lime might still prove a better proposition than relatively cheaper superphosphate if that necessitates heavy dressings of lime to produce a response comparable to that obtained from slag alone.

## Importance of Lime

**Observant farmers on lime-deficient soils have frequently remarked on the comparatively poor response sometimes obtained from phosphates without sufficient lime, and there can be no doubt that in the past much fertiliser has been wastefully applied. It is probably true also that lime has been used wastefully on soils where the lime deficiency is low.**

On soils showing high lime deficiency liming is a primary requisite to high production. Above—A heavy dressing is being applied to a Wellsford pasture.

Admittedly, large tracts of New Zealand show a high lime deficiency, and on such country liming is essential for high production. There are, however, soils on which lime responses are only slight or insignificant, and it is only prudent to try to ascertain what dressing is likely to be profitable before embarking on an extensive liming programme.

## Time of Application

Since the first tentative efforts to improve pastures by the use of artificial fertilisers the practice of applying the bulk of the topdressing in the autumn has gradually developed. Though carefully-conducted trials have demonstrated that about the same increase in production is obtained over the year from an application of fertiliser irrespective of the time at which it is applied, the time of application does materially affect the time at which much of this increase is produced. As an autumn application tends to produce much of its increase during the off season when feed is scarcest and most valuable, there is good reason for this practice, quite apart from greater convenience. But if the best results are to be obtained, the fertiliser should be applied early while the ground is still warm and conditions promise a reasonable period of vigorous growth.

If topdressed early, the pasture derives full benefit from the fertiliser and has a good start before cold weather chills the ground. If the grazing management is good, pasture plants which are making vigorous growth at the beginning of the cold weather will continue to make appreciable growth right through the winter. On the other hand, if the fertiliser is applied too late in the autumn, little immediate benefit is obtained and the response is likely to be delayed until the ground begins to warm up in the spring.

**To endeavour to have some selected fields topdressed early and closed up to provide greenfeed when even a little is of special value is therefore good policy. The fact that an increased rate of pasture growth in winter can mean an accelerated growth of pasture in early spring—often a critical period—is also a factor of some importance. Winter growth can best be fostered on a rich, well-sheltered, well-drained soil carrying a high proportion of ryegrass in the sward.**

## Spring Topdressing

Though the bulk of the fertiliser is probably best applied in the autumn it is often profitable to topdress some of the pastures in the spring. Such an application often proves extremely beneficial on a young autumn-sown pasture and gives the clover that extra encouragement which leads to successful establishment. The hay crop may also benefit considerably from a spring application of fertiliser.

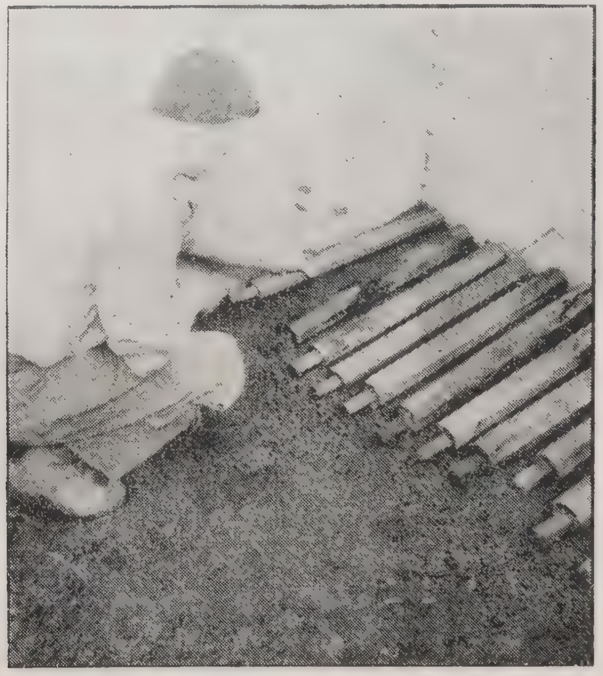
Where topdressing is applied during the summer results depend largely on the rainfall, which at that period is apt to be very uncertain.

Though lime can be applied advantageously at any time of the year, where superphosphate and lime are being applied separately it is desirable that the lime should go on before the superphosphate rather than after it. In that way danger of loss of phosphate through fixation may be minimised.

**If the fertiliser is available, few farmers now ask whether they can afford to topdress. The question more often is: Can I afford not to topdress? Topdressing is expensive, and every farmer should try to ascertain what manures are most profitable on his land and to use them to the best advantage.**

# Coke-breeze Sleeping Floors for Pig Houses

## Promise of Better Warmth Retention



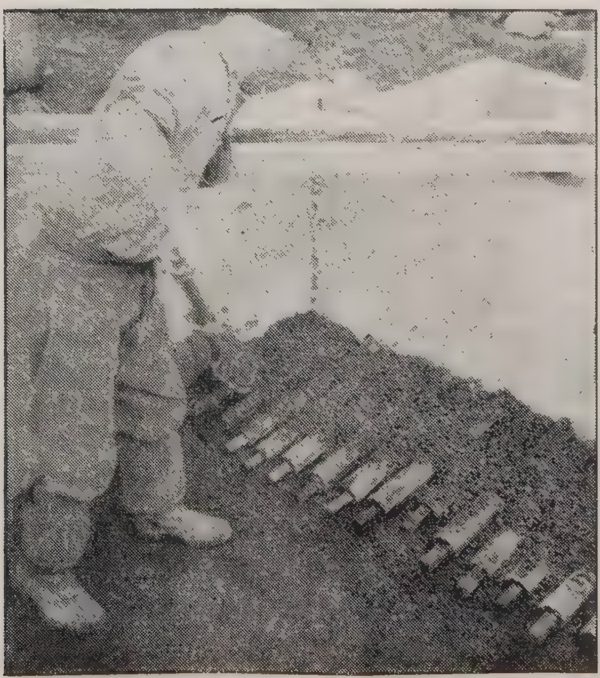
Mandrels laid in position for the first section of the floor. The bedding layer of breeze concrete has been brought clear of the fronts of the mandrels.

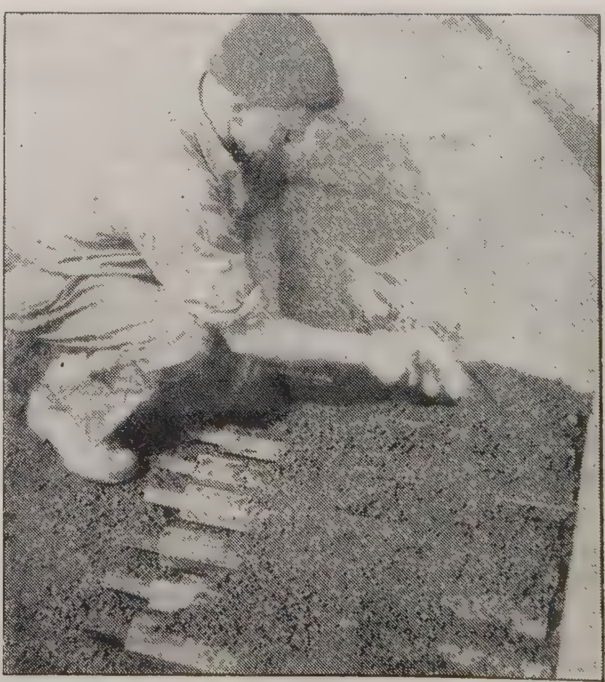
*By* A. LONGWILL, *Assistant Superintendent of the Pig Industry, and* I. H. OWTRAM, *Supervisor, Taranaki District Pig Council.*

AN important and ever-present problem in the housing of domestic livestock is the provision of a floor which is impervious to moisture, and therefore easily cleaned, and yet does not strike cold on the animals. In no branch of farming is this problem more acute than in pig raising. This article describes a promising New Zealand development—the construction of floors with concrete made with coke-breeze, a gasworks by-product.

IN countries where baconers are produced extensively it is usual to house the fattening pigs for a considerable period of their lives, and the provision of a suitable type of floor has been very carefully considered. Wooden floors have been found unsatisfactory because of lack of durability and difficulty of cleaning and disinfecting. Other materials, such as asphalt, cork brick, and rubber composition, have been tried with indifferent success, because of either high cost or lack of durability.

The type of floor which has finally been evolved overseas for this purpose is of ordinary concrete laid on an insulating layer composed of hollow concrete or terra-cotta blocks or of drain tiles laid close together. Sometimes the insulating layer used is merely well-packed brick rubble, but that is not always satisfactory and it is now generally regarded as the base on which the insulating layer is put down.





Left—Covering the mandrels with the mix. Right—Working the mix in between the mandrels. The space between the ends of the mandrels and the back wall is filled with concrete to block the ends of the cavities.

**It is important that the ends of the hollow blocks or drain tiles be sealed with concrete so that they form air cells which insulate the floor against temperature changes, and that in preparing the foundations a site be chosen which will not become waterlogged, preventing the insulating layer from doing its work.**

## Experiments with Materials

During the past 10 years there has been a tendency in New Zealand to erect pig houses with concrete floors and walls, and the problem of the most suitable floor has exercised farmers' minds. District Pig Councils have been active in having new ideas tried out—for example, the use of coarse pine sawdust in making a special "sawdust concrete" and the use of an insulating layer of field tiles.

A later development has been the use of coke-breeze as the basis of the aggregate in the concrete of the sleeping quarters area of the floor. This type of floor has been pioneered in Taranaki. Mr. T. J. Davis, chairman of the Taranaki District Pig Council, and Mr. C. H. M. Sorensen, who was for several years supervisor to the council, studied the performance of many types of floor, and finally Mr. I. B. Julian, of Kakaramea, Waverley, another member of the council, put down a number of experimental floors from which the method of handling coke-breeze in a concrete mix was ascertained. The method described is based on Mr. Julian's experience.

Coke-breeze is the dust from the crushing of coke at gasworks to reduce the lumps to convenient size for commercial use. It is obtainable at any gasworks at about 5s. a ton, which is about 2 yards. A ton is sufficient to lay 250 sq. ft.—four 8ft. x 8ft. sleeping floors.

The site is prepared by excavating to 10in. below the finished level of the floor, planning the fall as desired (Mr. Julian used ¾in. to 1ft.). The whole area of the house is then covered with a 5in. layer of rubble—broken brick, coke, coke-breeze, or scoria. If the site is dry and well drained, this layer will perform the necessary function of breaking the rise of soil moisture. An ordinary concrete floor laid directly on a rubble layer is much warmer than one put down without such a filling, but the coke-breeze floor may be still warmer, as indicated by temperature readings taken on the experimental floors at Mr. Julian's farm.

After more mix has been put on it is screeded to give a 1in. cover over the mandrels.

**Another bedding layer of mix is put down and the mandrels carefully drawn out on to it. Note the position of the left hand to prevent disturbance to the concrete previously laid.**

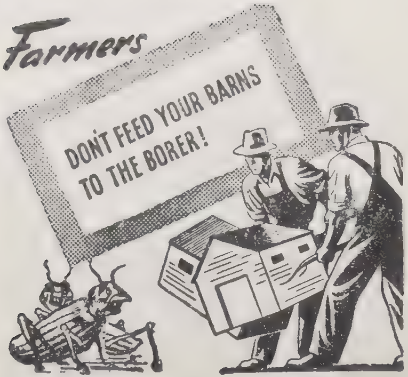
## Cavity Formers

Equipment for laying the sleeping floor is the same as used for ordinary concreting with the addition of some type of cavity formers, used to form the main cells, corresponding to the function of field tiles in a concrete floor using them for insulation. Beer bottles, old binder rollers cut in halves, or specially-made mandrels of the type illustrated may be used for this purpose. All that is necessary is that the formers have a smooth surface and even diameter and a handle by which they can be withdrawn to new positions as each section of the floor is completed. The disadvantage of beer bottles is that they require to be moved more frequently than the longer type of mandrel. The type illustrated was used by Mr. Jackson, Inglewood, who has also put in coke-breeze floors, and they are 2ft. 6in. long. With these the 8ft. x 8ft. sleeping floor can be put down in four sections.

Mr. Julian used beer bottles for formers and his method is as follows:—

Fix the marks to which the coke-breeze is to be screeded, leaving room for a ¾in. finishing layer. It is important to have the mix much drier than for ordinary concreting work and some practice is desirable to make sure that the mix is sufficiently dry to retain its shape as the bottles or mandrels are withdrawn. The mix employed is 6 shovelfuls of coke-breeze to 1 of cement; with fresh, dry breeze 1 gallon of water is sufficient.

**With such a dry mix it is important to mix the dry breeze and cement well and then add the water very carefully. The breeze must not be too coarse; one-third of its volume should consist of the finer grades.**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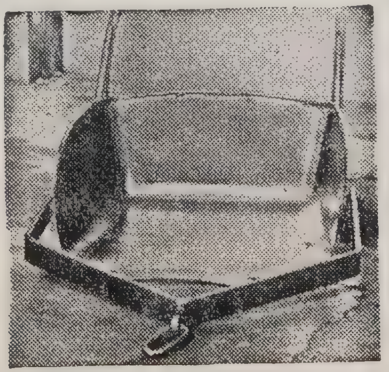

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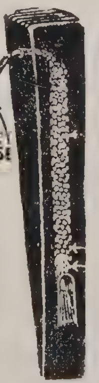

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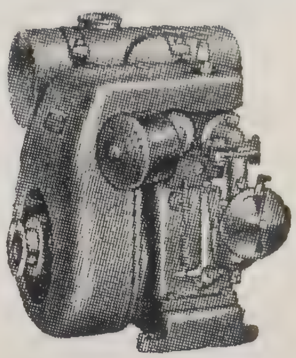

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## Method of Laying

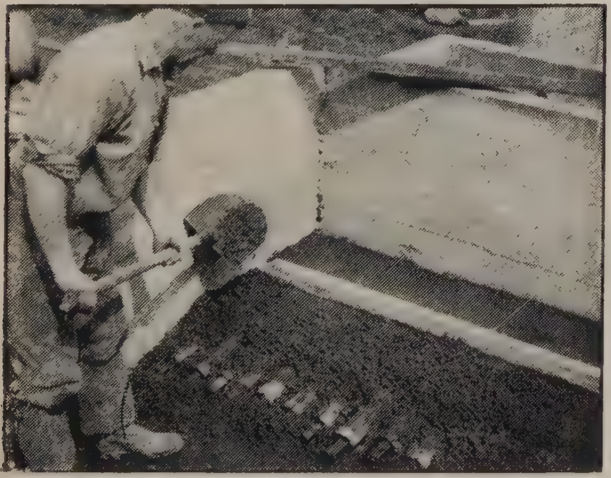
A layer about 1in. thick and slightly wider than the length of the mandrels being used is put down across the back of the floor. The mandrels are laid on this bed with their ends about 2in. from the back wall. Mr. Julian spaced his bottles 3in. apart, but in Mr. Jackson's floors the mandrels were only 1½in. apart, which not only gives a higher proportion of air space in the floor but uses less breeze and cement. If these floors stand up to wear as they promise to, they should give very satisfactory results, but it has not yet been possible to obtain temperatures for comparison with those recorded by Mr. Julian.

The bottles are arranged equally spaced and parallel, and then the mix is carefully filled in over them to a depth of 1in., taking care that the bottles do not move out of place and that the mix is well worked down between them with the trowel or float. The whole is well tamped down and screeded to a rough surface with an ordinary timber screed. Having completed the first section, another thin bedding layer of mix is put down and the bottles carefully drawn out from the completed section by grasping the neck with one hand while the other is pressed gently on the edge of the concrete immediately above. If the mix is dry enough, this will prevent any movement

With all bottles withdrawn so that only about 1in. of the bottom remains in the cavity, the next section is completed by covering the bottles in the same way as before. The process is repeated until the front of the floor is reached, when the bottles are completely withdrawn before the front boxing board is put up and the front of the sleeping floor filled with solid concrete, sealing off the ends of the air cavities. Using bottles an 8ft. x 8ft. coke-breeze cavity floor can be put down in two hours by two workers.

**After four or five days the floor is hard enough to walk on, but up till that stage care is necessary to ensure that nothing walks on the floor or the cavities may be broken down.**

The floor is finished with a ¾in. layer of a plaster made by mixing 3 measures of finely-sieved coke-breeze with 1 part of cement. As the underlying floor is very absorbent, a very wet mix is necessary for plastering or the loss of water to the lower layer will make it impossible to work the plaster to a good finish. If necessary a final wash of pure cement can be given to seal the surface definitely. In putting on the final plaster the corners at the bottoms of the walls can be rounded out to facilitate cleaning.



After having the mix worked between them the mandrels are covered again to complete the second section.

The final section completed, the mandrels are completely withdrawn and the ends of the cavities sealed with another layer of the mix.

It is as well to lay boards on which to walk over the floor while the plastering is being done to obviate the risk of breaking down any of the cavities, though that risk should not be great after 4 days.

## Ten Degree Advantage

The finished floor is as hard and impervious as ordinary concrete and promises to wear well, and it is considerably warmer in the winter than even a good floor insulated with field tiles. That was shown by the following temperatures recorded at Mr. Julian's farm during July, 1946, by thermometers plugged into the cavities in the floors:—

| | 10 a.m. (degrees F.) | 1 p.m. (degrees F.) | 4.30 p.m. (degrees F.) |
|---|---|---|---|
| **Temperature of air in houses** | 57 | 59 | 55 |
| **Field tile floor temperature** | 74 | 68 | 63 |
| **Coke-breeze floor temperature** | 84 | 76 | 73 |

Though the coke-breeze floor appears to have lost more heat between 10 a.m. and 1 p.m., and therefore a greater total drop might have been expected, that did not happen in this set of recordings, both floors having lost the same heat during the 6½ hours.

**The coke-breeze, on these figures, shows a clear advantage of 10 degrees F. over the field tile floor, which, it is important to remember, would feel relatively warm under the temperatures recorded. This new type of floor seems to offer distinct possibilities for such uses as pig sleeping quarters and calf houses, and further careful experiments are planned at the Animal Research Station, Ruakura, to determine more accurately its value compared with other useful types of floor.**

Cases have been reported of pigs "rooting" into a floor where coke-breeze filling has been used, the coke apparently attracting the pigs. Farmers experimenting with this type of floor are advised to make sure that the plaster seal is sound and has no weak spots where the pigs can start to root.

Winter is the expensive feeding time. If pigs can be housed on warm floors such as these, the food-sparing effect will be considerable and may have a very important bearing on the economy of wintering pigs on farms where soil conditions preclude wintering out on crops.

*Photographs by "Farmer Weekly."*

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# Cause and Prevention of Silver Leaf in Orchards

*By* G. H. CUNNINGHAM,
*Director, Plant Diseases Division,
Department of Scientific and
Industrial Research, Auckland.*

SILVER LEAF or silver blight (*Stereum purpureum* Pers.) is widespread in orchards throughout New Zealand. It occurs also in Australia, Canada, South Africa, Europe, and North America. The disease attacks many different plants, being common in New Zealand on almonds, apples, apricots, cherries, currants, gooseberries, nectarines, peaches, pears, plums, and quinces, as well as on many ornamental shrubs and trees such as laburnum, lilac, poplar, silver birch, and willow. It has not been found on indigenous plants.

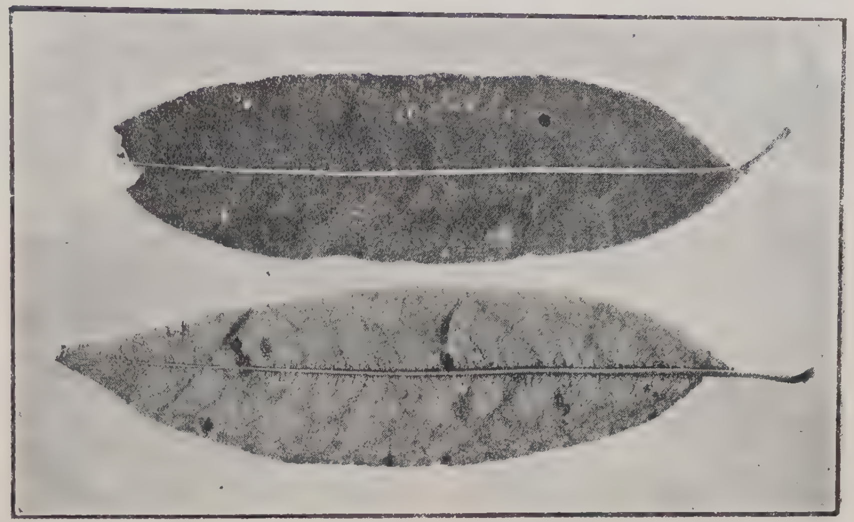


Fig. 1—The under surface of a healthy leaf and a silvered leaf of a Solway peach. Two-thirds natural size.

THOUGH silver leaf attacks pip fruits, its effects are not as severe as on stone fruits. In New Zealand apple orchards it probably causes about 1 per cent. loss, on pears its effects are less marked, but with apricots and peaches the loss is well over 10 per cent., and even more in the case of plums. It probably causes as great a loss as any other orchard disease, with the possible exception of black spot, but its severity is not readily noticeable, probably because of its gradual onset. A serious feature of the disease is that it cannot be controlled by spraying.

## Appearance in the Field

Silver leaf attacks shoots, stems, and roots of woody plants. The first indication of infection is a silvering of the leaves, which change in colour, becoming greyish tinged with green, and tend to curl slightly at the edges (Fig. 1), so that an infected tree is discernible at some distance.

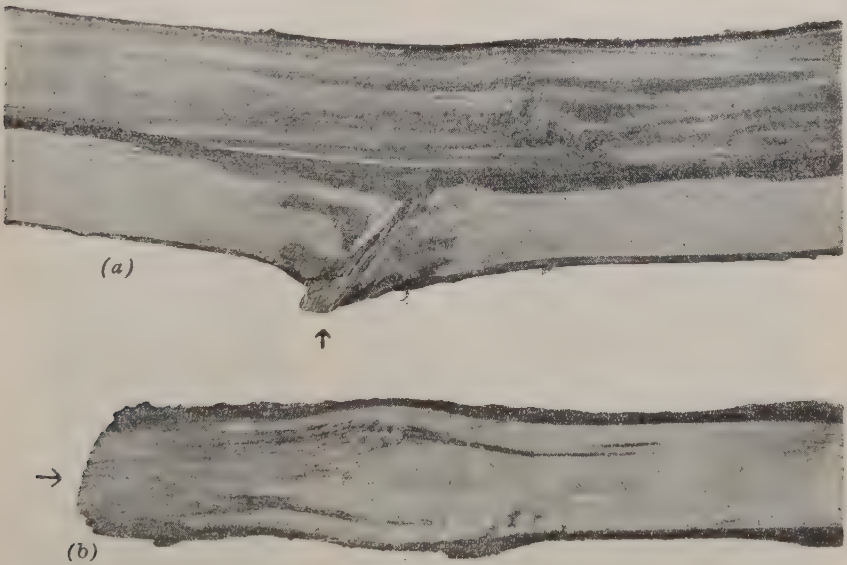


Fig. 2—Wood infected with *Stereum:* a, A willow branch showing the area discoloured by the fungus (median section through Fig. 8a); the arrow points to the place of entry through the stub of the branch; two-thirds natural size. b, A shoot of a peach which was showing silvering in the leaves; the arrow points to the place of entry of the fungus through the unprotected stub of the branch; natural size.

**Silvering shows as a rule first on one or two small branches, and extends rapidly until all branches on a limb become infected; it then spreads to other limbs until all are infected. Leaves fall prematurely, and branches become bare and stand out prominently. Sometimes leaves silver simultaneously over the entire tree—an uncommon manifestation of the disease.**

When the disease is confined to a single branch infection has taken place through some injury on that branch, but when silvering is general over the entire tree the causal organism has gained entry through stem or root. Infection is usually followed by death of branch or tree, though occasionally trees recover. They are not then immune to further attack, however, and may succumb to a later attack of the fungus. Death of an infected branch or tree may occur within a few weeks after silvering first appears, but trees usually live for one or more seasons after becoming infected.

Infected wood becomes brown, discoloration being first noticeable at the point where the organism gained entry (Fig. 2). Browning is not so noticeable in young shoots, appearing there as discoloured streaks which diminish in size and number toward the apex. Occasionally no change in colour of the wood occurs in shoots bearing silvered leaves.

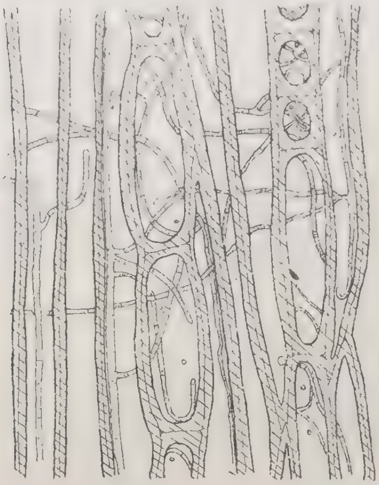


**Fig. 3—Section of wood from a willow taken from the zone between discoloured and normal wood shown in Fig. 2a. The hyphae are crowded in the region of the medullary rays. × 500 diameters.**

## Cause of Silvering

Silvering of leaves is caused by separation of cells of the epidermis from the palisade cells beneath (Figs. 4 and 5). Air cavities are formed which prevent the chloroplasts (cells containing green colouring matter of the leaf) from being seen clearly through the epidermis. The other leaf cells also become somewhat disintegrated. Separation is caused by a solvent substance produced by the fungus. Carried in the water-conduction vessels of the wood to the leaves, this substance dissolves the middle lamella (Fig. 6), causing cells to separate from one another.

A silver leaf condition resembling that produced by this disease is sometimes present on fruit trees and ornamental shrubs. The silvering common on species of lauristinus (*Viburnum*) and rhododendron, for example, is caused by an infestation of thrips. Temporary silvering may also be induced by drought or alkali soils. True silver leaf may be distinguished from the false by the starved appearance, frequent dead branches, and occasional presence of fructifications of the organism.

After the death of the tree, or even a single branch, fructifications of the fungus appear on the bark (Fig. 8). They are fan-shaped brackets, usually about 1in. across, though they may attain a diameter of 3in. or more. Frequently the upper portion grows at right angles to its support, forming a minute shelf (Fig. 7a), when the upper surface is covered with coarse fibres arranged in light and dark-coloured zones. The free surface of the fructification is smooth and ranges in colour from white. through salmon pink, to purple.

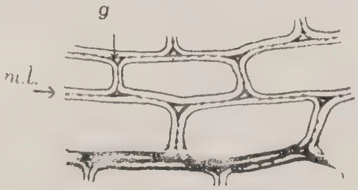


**Fig. 6—Section of parenchyma of an apple shoot, showing middle lamella *(ml)*, and gussets or thickened portions *(g)*, which were at one time intercellular spaces. × 500 diameters.**

## Life History of Organism

For many years the cause of silver leaf was unknown, being attributed to such agencies as unsuitable manures or too heavy pruning. In 1902 J Percival, in the "Journal of the Linnean Society," suggested that the disease was caused by *Stereum purpureum* Pers., his reason being that this fungus invariably appeared on trees that had been killed by silver leaf. His suggestion was not generally accepted by mycologists at the time, largely because mycelium of the fungus could not be found in the leaves. Subsequent inoculation experiments (in which pieces of fructifications of *Stereum* were inserted beneath the bark of a tree, and invariably within a short time produced a true silver leaf condition in leaves and wood) have proved beyond doubt that *Stereum* is the cause of this disease.

A typical fructification consists of a flat disc-like or shelf-like receptacle consisting of closely-packed hyphæ so woven together that it assumes quite a leathery appearance. This receptacle is attached to the bark by numerous hyphæ which penetrate deeply into the wood. Its free surface is lined with a coloured layer, the hymenium, composed of basidia and paraphyses packed closely together (Fig. 7b) The apices of the basidia carry four small projections, sterigmata (Fig 7c *st*) on which basidiospores (Fig 7c *sp*) are borne. The paraphyses are sterile basidia (Fig. 7b). Basidiospores are readily detached, and are carried by wind or other agency to

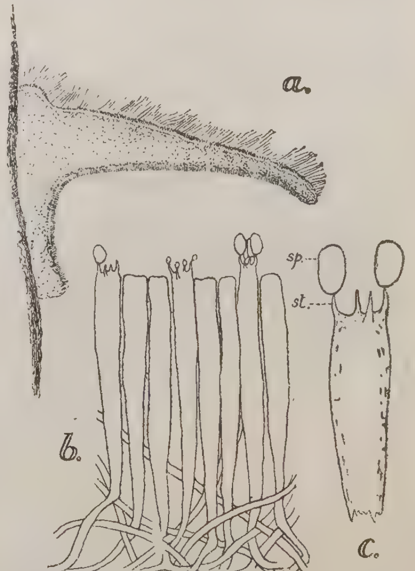
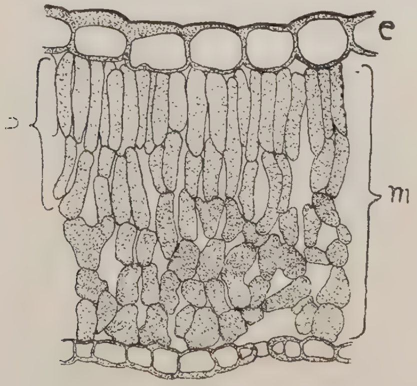


**Fig. 7—a, A section through a fructification of *Stereum;* showing the hairy upper surface and the smooth lower surface; the lower surface is the hymenium or spore-bearing surface; × 500 diameters. b, Camera lucida drawing of a section of the hymenium, showing basidia and paraphyses; × 500 diameters. c, Basidium, showing sterigmata *(st)* and basidiospores *(sp)*; × 1000 diameters.**



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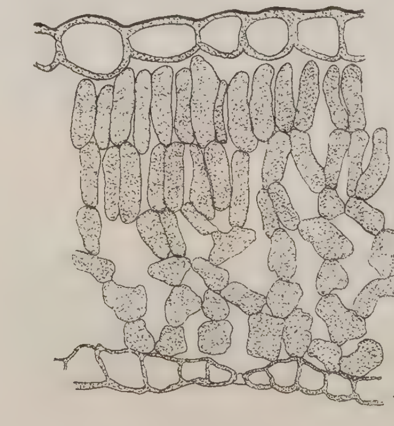

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**Fig. 4—Section of a healthy leaf of peach showing *(m)* cells containing chlorophyll (stippled); *(p)* palisade cells, and *(e)* epidermis; × 350 diameters.**

**Fig. 5—Section of a silvered leaf, showing separation of the epidermis from the palisade cells and disintegration of the mesophyll cells; × 350 diameters.**

trees growing in the vicinity. Should a spore alight on a wounded surface of a tree, it germinates and produces a fine germ-tube (hypha) which penetrates cells of the wood, where it grows and branches repeatedly, the branches (hyphæ) penetrating into the killed cells. It is probable that from the tips of the hyphæ is secreted a substance which has a solvent action on cell walls. This substance kills cells in advance of the hyphæ, and acts on them in such a manner that they may readily be penetrated by the hyphæ.

*Stereum* is normally a saprophyte, growing on dead stumps of poplar, willow posts, and fallen logs of those trees, but, should opportunity arise for its hyphæ to penetrate living tissues through some wounded surface, it becomes an active parasite. In living branches hyphæ are confined to the wood, where they grow toward the apex of the branch much more rapidly than toward the root. When all cells in the vicinity have been killed, and the branch in consequence has died, hyphæ grow to the surface, where they branch repeatedly to form fructifications on which spores are produced, so completing the cycle.

Fructifications, and consequently spores, may be produced at any time of the year. They appear more frequently during wet weather, and favour a moist atmosphere such as surrounds the base of a tree when it is covered by grass or weeds. Spores may be produced at intervals during the life of the fructification, which in many instances persists for several seasons.

The fungus infects living trees only through wounds, which in orchard practice are constantly being inflicted on trees. During cultural operations portions of bark are frequently abraded by chains, swingletrees, or cultural implements. In picking, branches frequently become broken or split at the forks. In pruning, small wounds are made by the secateurs and large wounds by the saw. Pests such as woolly aphis or cicadas form cankered areas which afford excellent opening for the entry of spores.

## Preventive Treatment

**The fungus is spread by spores produced on the fructifications, and by that means alone. Spores gain entry into tissues of a tree only through a wound or bark injury. By removing fructifications and coating wounded surfaces with a protective covering the disease can be kept within reasonable limits, if not defeated altogether.**

The following treatment is recommended:—

Remove and burn branches and stumps that show signs of silver leaf or have been killed by it. Destroy dead stumps of shrubs and trees carrying fructifications of *Stereum.* It is not sufficient to cut off the fructifications, as the wood is permeated with mycelium, which will produce more fructifications as soon as conditions are favourable.

Protect wounded surfaces over 1in. in diameter, so that spores cannot enter crevices. This first necessitates cutting all broken branches off cleanly, an operation which should be performed as close to the main branch as possible, so that the wound may quickly callus over. Injuries caused in cultural operations should be dressed smooth, and loose pieces of bark removed.

Finally, exposed surfaces should be dressed with a wound covering as soon as they are made. The most efficient has proved to be bitumen paint, which not only provides an excellent cover but does not adversely effect bark or wood (J. D. Atkinson, "Orchardist of New Zealand," Vol. 11, 1938). Wound dressings should be renewed annually or until the wounds callus over. This is a necessary precaution, as all large wounds have a tendency to crack and expose wood uncovered with any protective coating.

The disease is not spread by secateurs used in pruning operations.

Spraying is useless for controlling silver leaf, as the mycelium is internal and cannot be reached by sprays. Sulphate of iron, which was at one time freely recommended, has proved ineffective, and injections into the tree of substances toxic to the fungus have proved useless as a controllant.

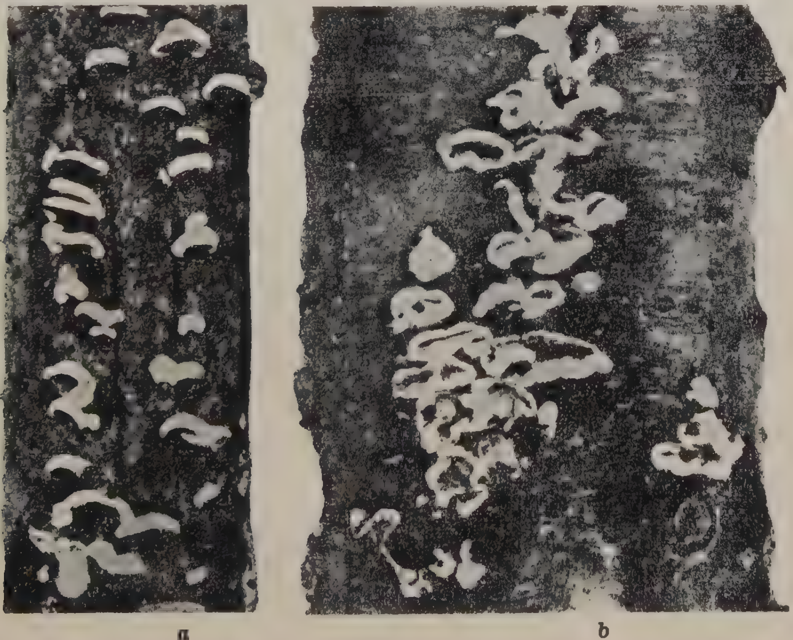

**Fig. 8—*Stereum purpureum* Pers. a, on a willow branch; b, on the trunk of a living peach tree. Two-thirds natural size.**

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## Measurement of Areas

**Rectangles:** The area is reckoned by multiplying the length by the breadth.

Where each of the four sides of a rectangular paddock is of different length the length of opposite sides should be summed, the average taken, then the average length multiplied by the average width.

With paddocks of more than four sides special means may be required to compute acreage accurately; where such irregular areas can be subdivided into a series of rectangles and triangles (half rectangles) the sum of the areas of these will give the acreage.

The actual ground acreage of hill country sections can be only approximately gauged from fence-line measurements. In practice it is customary when sowing these to make allowance for this fact by estimation of the additional acreage due to surface configuration.

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# Autumn-sown Pastures

*By* P. S. SYME, *Instructor in Agriculture, Warkworth.*

AS recently as a generation ago good permanent pastures were to be found only on land which was of high natural fertility, and the credit was ascribed to the land rather than to the farmer. But now excellent pastures are to be found on land which was naturally poor, and the credit must go to the farmer. This article describes some of the developments which have made this change possible.

MANY farmers will remember the days, not so far distant, when really first-class pastures were to be found only on naturally fertile land where management and climate combined to favour pasture growth. Natural fertility, of course, is still an asset, but with the wider appreciation of the value of topdressing, improvements in strains of seeds, and a better understanding of the problems involved in making and maintaining a good pasture, high natural fertility is no longer regarded as essential.

**On the contrary, experience has proved that where the climate is favourable excellent permanent pastures can be developed on very unpromising soils. With the new knowledge and the better technique now available, much land once regarded as almost worthless can now be made to carry excellent pastures.**

## Cultivation Important

Of recent years giant discs have tended to replace the plough. Though admitting the versatility and convenience of discs, many experienced farmers deplore this change, but on land where ploughing is difficult good discing is probably better than bad ploughing.

Irrespective of the methods employed, the importance of a well-prepared seed-bed can scarcely be exaggerated. Whether the surface tilth should be fine or left fairly rough depends to some extent on circumstances. When sowing in autumn on some soils, particularly where the texture is heavy, there may be a risk, if the surface tilth is made too fine, that heavy rains will cause the surface to set into an airtight crust and so prejudice the germination of the seed and the speedy establishment of the young plants.

## Need for Consolidation

An important point sometimes overlooked is the need for proper consolidation on the lighter classes of soil. Though many seeds such as ryegrass can establish on quite loose soils, white clover establishes best on a surface which has been well consolidated, and will in fact often fail if the surface soil is left free and loose.

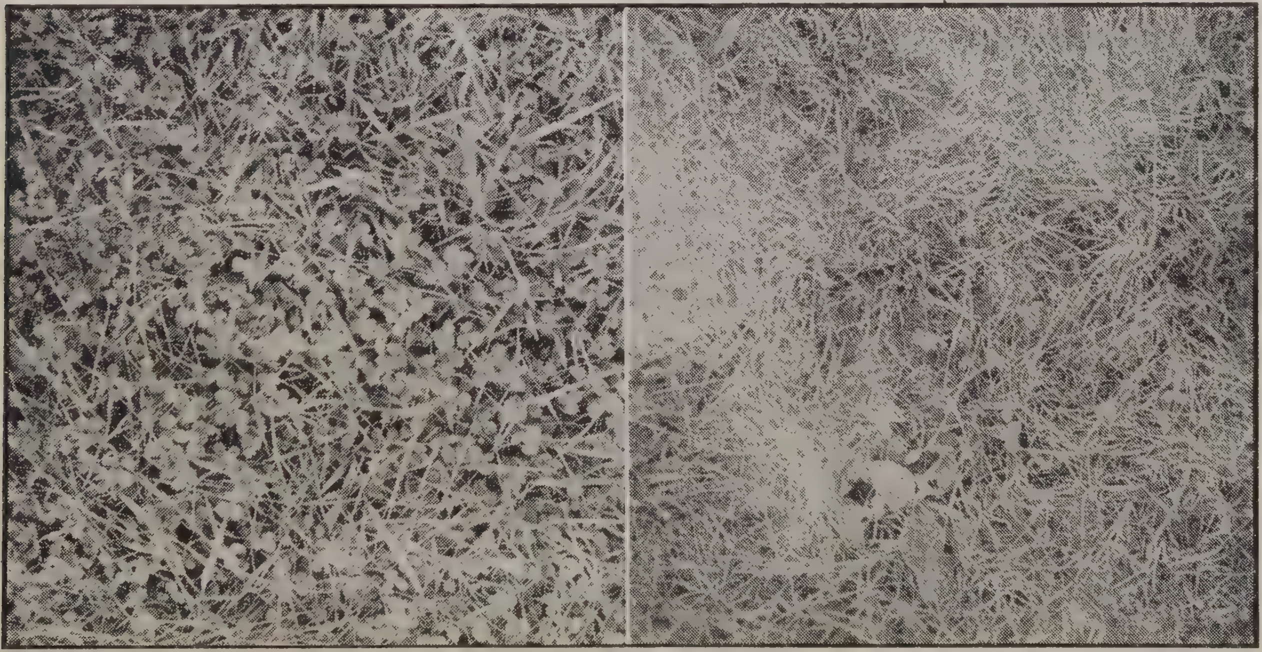
That frequently explains why the grass elements often establish quickly on the lighter types of soil while the white clover may partially or completely fail. On such soils the roller is a valuable if not indispensable implement.

## Topdressing and Liming

Both ryegrass and white clover demand a high standard of fertility if they are to make vigorous growth; moderate fertility is not enough. Most New Zealand soils are deficient in phosphate, many are deficient in lime, and some are deficient in potash. Nitrogen, which is very important for vigorous grass growth, is generally in short supply.

Under these conditions it might appear optimistic to expect species which demand high fertility, like ryegrass and white clover, to succeed on land which previously carried nothing better than scrub. The answer is in the clovers and their ability to make sufficient nitrogen available for their own needs and for the associate grasses. By ensuring a sufficiency of phosphate, lime, and potash it is possible to build up strong and vigorous clovers, and these in turn provide sufficient nitrogen to promote vigorous grass growth.

**Here lies one of the secrets of a fertile pasture. By applications of lime and phosphate, which are relatively cheap, clover can be used as a medium to build up**



Only the best seed should be used and the mixture should be compounded to suit conditions on the farm. The two pastures above were sown on the same day and treated identically. The difference is due to the seeds mixture. That on the left contained 25lb. of Certified ryegrass and 3lb. of Certified white clover; the one on the right was bought "mixed" and of unknown pedigree.

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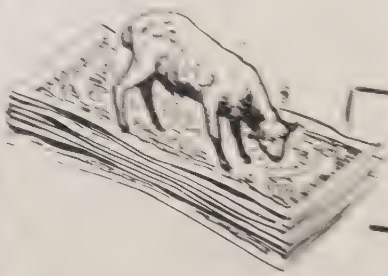
EXCHANGE SHOULD BE ADDED TO ALL CHEQUES.

# WORM CONTROL

Dosing sheep costs PENCE



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**supplies of nitrogen which, if it had to be applied as fertiliser, would be extremely costly. A vigorous growth of clover can supply nitrogen equivalent to 1cwt. of sulphate of ammonia an acre a month, as well as providing valuable feed.**

Quantities and varieties of fertiliser largely depend on local conditions. When lime is used it is commonly applied about a fortnight before the sowing of the seed and the phosphate is usually applied at 3 to 4cwt. an acre when the seed is sown. Potash is not usually used except on soils in which it is known to be deficient.

### Time of Sowing

The best time for an autumn sowing, assuming that the land is ready, depends to some extent on locality and seasonal conditions. Generally, grass can be sown from the last week in February until April — if conditions seem to be favourable, the earlier the better. If the seed is sown early while the ground is warm and given sufficient moisture, germination and growth are very rapid and the pasture becomes well established before the cold weather. Late sowings are likely to be hazardous, particularly as cold weather has a depressing effect on the establishment of the young clover plants.

Though much depends on the season, even a week's difference in the time of sowing can have a marked effect on the amount of autumn growth and the ability of the young plants to survive and grow through the winter into the spring.

### Seeds Mixtures

Not very long ago it was a common practice when compounding a seeds mixture to include a little of everything. Now, with a fuller knowledge of the requirements of species and of what constitutes a good pasture, the tendency is to use simpler mixtures and to include only species which experience shows are likely to succeed under the conditions and which are of proved value in a sward. Prescriptions used range from a simple mixture of 20lb. of Italian ryegrass and 5lb. of red clover for a temporary pasture to about 40lb. of mixed seeds an acre for a permanent pasture on cultivated ground. The most important components usually are ryegrass and white clover, but, according to circumstances, paspalum, cocksfoot, timothy, dogstail, red clover, subterranean clover, and *Lotus major* may be included.

The whole of the ryegrass sown may be perennial, or, if importance is attached to some early feed, the ryegrass may include a proportion of Italian or some of the new hybrid known as H1. This is a cross between the true perennial and Italian ryegrass which combines the virtues of both to some extent. It provides more quick feed than the perennial but less than the Italian, and persists, in diminishing quantity, longer than the Italian, lasting 3 to 4 years if conditions are favourable.

Cocksfoot and timothy, though commonly sown, frequently fail to establish or disappear in the first year, and whether they should be included depends largely on soil, climate, and the system of management adopted. Under proper grazing management and suitable conditions paspalum has proved a valuable complement to ryegrass, its drought-resisting property making it particularly valuable in a dry summer.

White clover, because of its high production and permanency, is usually regarded as the most valuable legume in a permanent pasture on good land. Red clover is commonly included, the Montgomery strain sometimes being preferred to the broad red because of its longer life. As red clover is a vigorous grower, care must be taken not to include too much seed lest it smother the permanent white clover. If present in excess, it is also likely to cause trouble with bloating.

**On land where white clover is difficult to establish subterranean clover is frequently included in a mixture. This clover will survive with less topdressing than is needed to maintain white clover and is particularly valuable because of its ability to grow well through the late winter and early spring. It is less valuable than white clover on land where white clover grows well.**

*Lotus major* is valuable on moist soils where other clovers do not thrive, and when lavishly topdressed has proved useful in combating weeds such as rushes.

### Surface Sowing

As an alternative to ploughing and resowing a poor pasture, surface sowing of selected grass and clover species has long been common. Without a properly-prepared seed-bed success depends largely on the weather following the sowing, and, because of the risk of too hot weather shrivelling the seedlings as they germinate, such sowings are frequently deferred till late March or April.

The sward should be grazed down before being sown and it is an advantage if it can also be well harrowed to help provide some kind of seed-bed. Even if the percentage of seeds from which plants establish is low, the only cost incurred is for the seed, which is applied with the topdressing. White clover and subterranean clover in particular have been cheaply and successfully established in this manner.

### Mixture Should Suit Conditions

Because of the very wide range of soil and climate, as well as of systems of management, it is desirable that a seeds mixture should be compounded with a full knowledge of the conditions on the farm. Some farmers rely on a prescription recommended by a friend or by a seeds merchant, who may have little knowledge of the circumstances. Within certain limits, factors such as management and fertility rather than the choice of mixture will decide the ultimate composition of the sward, but a badly-designed mixture wastes money and may result in a poor pasture. In view of the high price of seeds and the outlay involved in grassing, it is folly to sow without making certain that the mixture will prove satisfactory. The Department of Agriculture employs specialists for testing seeds, and its fields officers, having a knowledge of local conditions, are in a position to give reliable advice.

**A good seeds mixture, sown on a well-prepared seed-bed at the right time and properly manured, well seldom fail to produce a good pasture even in an adverse season. If good Certified strains of seed are used, the pasture should have a long and highly-productive life and the farmer can be assured that under good management his perennial ryegrass and white clover will hold indefinitely.**

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## Diagrams of Stacking Baled Hay

In the article "Methods of Stacking Baled Hay" in the December issue of the "Journal of Agriculture" a mistake occurred in the diagrams on page 535 of the layers in building a square stack. Fig. 10, third and sixth layers is correctly drawn, but through an error in preparing the page the diagram was inserted on its side. If readers who wish to follow the diagrams in stacking replace the diagram as printed in December with that appearing below, a correct sequence in locking the stack will be obtained

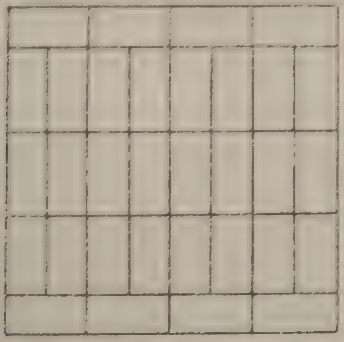


Fig. 10—Third and sixth layers.

# Determining Tonnage of Stacked Hay

THREE types of stack are common in New Zealand:—

1. Rectangular with ridged roof.
2. Rectangular with rounded roof sloping away at one end.
3. Round with conical roof.

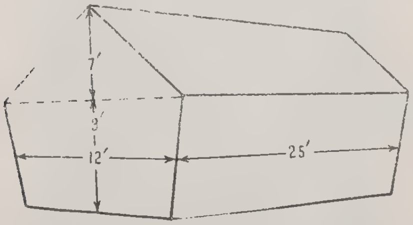
**To estimate the cubic capacity of 1:** Measure the length and width of the stack in feet half-way between ground and eaves. Now measure the height from ground to eaves and add half the height from eaves to ridge. The product of these figures is the cubic footage of the stack.

**Example:**

Length of stack between ground and eaves = 25ft.

Width of stack between ground and eaves = 12ft.

Height of stack between ground and eaves = 9ft. plus half height of eave to ridge (3ft. 6in.) = 12ft. 6in.



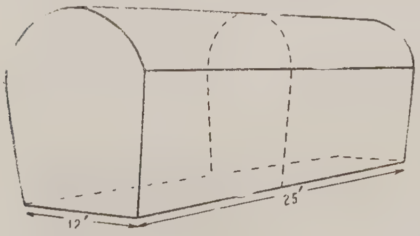
Cubic footage = 25 × 12 × 12.5 = 3,750 cub. ft.

Tonnage mature hay at 300 cub. ft. per ton = $\frac{3,750}{300}$ = 12½ tons.

**To estimate the cubic capacity of 2:** Measure the "over" from the base at one side to the base the other side of the stack midway between the two ends, then measure the length and width. A formula is now used to obtain a factor which is multiplied together by length and width.

**Example:**

Over midway along length of stack 35ft. Width 12ft. Length 25ft.



To obtain factor:

(a) Multiply over by .52 = 35 × .52 = 18.2.

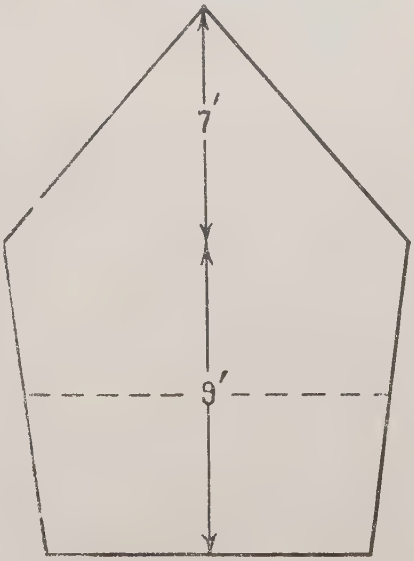
(b) Multiply width by .45 = 12 × .45 = 5.4.

Subtract (b) from (a) = 18.2 — 5.4 = 12.8.

Now multiply width × length × factor = 12 × 25 × 12.8.
= 3,840 cub. ft.

Tonnage mature hay at 300 cub. ft. per ton = $\frac{3,840}{300}$ = 12⅘ tons.

**To estimate the cubic capacity of 3:** Measure the circumference of the stack half-way between eaves and ground, square this, multiply by .08, and the height from ground to eaves. This is the cubic capacity of the body of the stack. The top is reckoned as follows: Circumference at eaves squared × .08 × $\frac{1}{3}$ height eave to peak. Add the cubic footage of the body and conical top to obtain the total cubic content of the stack.



**Example:**

**Cubic capacity of body of stack:** (Circumference squared × .08 × height ground to eaves)

$\frac{38}{1} \times \frac{38}{1} \times \frac{.08}{1} \times \frac{9}{1}$ = 1,039.7 cub. ft.

**Cubic capacity conical top of stack:** (Circumference squared × .08 × $\frac{1}{3}$ height eave to peak)

$\frac{42}{1} \times \frac{42}{1} \times \frac{.08}{1} \times \frac{7}{3}$ = 329.3 cub. ft.

Total cubic content of stack (base plus top) 1,039.7 plus 329.3 = 1,369 cub. ft.

Quantity oats at 350 cub. ft. per ton = $\frac{1,369}{350}$ = 3.9 tons.

## Estimation of Tonnage

Having obtained the cubic footage of any haystack the tonnage is reckoned by dividing the cubic footage by the number of cubic feet of hay to the ton. The number of cubic feet of hay per ton is very variable and depends among other things on the length of time the hay has been in stack. One authority states that for lucerne 512 cub. ft. per ton is normal after 2-3 months in stack, this decreasing to 440 cub. ft. per ton after 10 months. Other references for grass hay give a figure of 350 cub. ft. per ton for old hay, 400 for new hay, and 300 for sheaf hay. For the cereals Algerian oats after one month's stacking are estimated at 350 cub. ft. per ton, and after 9 months 250-280 cub. ft. Wheat and shotty-headed oaten straw are reckoned 10-15 per cent. less than the above figures.

## Determining Tonnage of Silage

Silage is commonly either pitted or stacked. The pit may be circular, square, or in the form of a trench, though the circular form is usual because for any given volume ensiled this offers less surface space and consequently the likelihood of less wastage. Stacks are nearly always circular for the same reason. The cubic footage of circular stacks or pits is estimated by multiplying the area of the end by the height, or if tapered the diameter is taken half-way between base and top to compute the end area, and this multiplied by the height. The cubic content of square pits = length × breadth × height.

As with hay the weight of silage per cubic foot is very variable, depending on the crop ensiled, size of silo, packing, etc. From various tables an average figure for well-settled silage is 50 cub. ft. per ton. This figure may be decreased by up to 5 cub. ft. per ton for the largest stacks and silos.

*A. D. MERCER,*
*Fields Instructor, Auckland.*

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### PASTURE PRODUCTION IN N.Z.

An outstanding summary of the appearance and uses of the grasses and clovers in the Dominion is given by S. H. Saxby in Bulletin No. 250, "Pasture Production in New Zealand," which is available at 1/- a copy (post free) from the nearest office of the Department of Agriculture. He discusses the different types of grassland with the management and seed mixture required for each. The top-dressing, harrowing, and topping of pastures, the making of hay and silage, the establishment of new pasture and many other important practical aspects of grassland management are dealt with in a clear and helpful manner.

# *TOMATO RESEARCH IN ENGLAND*

*By* SIR THEODORE RIGG, *Director of the Cawthron Institute, Nelson.*

THE major centre of tomato research in Great Britain is the Cheshunt Station, in the Lea Valley some 15 miles north-east of London. Other important work on tomatoes is carried out at the John Innes Horticultural Station at Merton, Surrey, and at the Long Ashton Fruit Station, near Bristol.

AT the Cheshunt Station investigations on tomatoes, cucumbers, and flower culture have proceeded for more than 25 years under the able direction of Dr. Bewley. The work has included tests for soil disinfection with both steam and chemicals, the manuring of glasshouse crops, the value of organic and synthetic nitrogenous manures, the breeding of improved varieties of tomatoes, and the study and control of fungous, virus, and insect diseases.

## Steam Sterilisation

After many years' experience of steam and chemical soil disinfectants, Dr. Bewley considers that steam treatment is the more effective. Steam treatment of glasshouses every other year is now recommended, in contrast to the previous procedure of steaming once in 3 or 4 years. Under Nelson conditions the investigations of the Cawthron Institute have shown the importance of annual steam treatment in maintaining tomato production.

This difference in procedure in the two countries is possibly connected with the more effective but more expensive method of steam sterilisation adopted at Cheshunt. In England the top spit of soil is removed, the subsoil forked up, and the steam grid then laid in the trench and covered with 12in. of soil from the next spit. Steam is passed through the grid at a pressure of not less than 80lb. a square inch for a minimum of 10 minutes. The longer time of steaming under English conditions and the penetration of the steam upward probably ensure more effective sterilisation than under Nelson conditions of soil steaming.

## Manurial Treatment

Early experiments at the Cheshunt Station showed the great importance of all three plant nutrients, nitrogen, phosphate, and potash. Potash appeared to have a special value in reducing blotchy ripening of the fruit and in safeguarding the plants against certain virus diseases.

Present manuring practice at Cheshunt is on a very liberal scale, but a crop of lettuces follows tomatoes and manurial treatment is designed to cover the needs of both crops. About 14 tons of horse manure an acre is used in the first digging of the house, together with 8oz. of superphosphate or bone and 4oz. of sulphate of potash to the square yard. After planting of the tomatoes, a topdressing of 2oz. of sulphate of potash to the square yard is used early in the season. Further topdressings of a mixed fertiliser containing superphosphate, sulphate of potash, and dried blood are given during the fruiting of the plants until a total of 8oz. of the mixed fertiliser to the square yard has been applied.

Under this manurial programme the plants make heavy growth and as many as 13 trusses of fruit are formed. Top growth is heavy. The plants have less fruit to the truss than in Nelson, but the yield for each plant, 8lb., is about the same as the average in tomato houses in Nelson.

**Though the results obtained in England with this treatment are good, there is some evidence that the very liberal use of potassic fertilisers on the soils of the station is bringing about a magnesium deficiency, symptoms of which were noticed at both the Cheshunt and the John Innes Horticultural Stations.**

In the tests of organic and synthetic nitrogenous manures carried out at Cheshunt Station little difference in the growth and yield of tomatoes was noticed for the first 8 years of the experiment, but more recently the plots with organic nitrogen have shown to great advantage over those treated with synthetic nitrogen. As superphosphate and sulphate of potash were used on both series of plots, it seems clear that the use of dried blood on one set of plots has resulted in better soil conditions than has the continued use of synthetic nitrogen in the form of ammonium sulphate.

The reasons for the superiority of the dried blood are not clear, but it is suggested that the bacterial flora is better with dried blood than with ammonium sulphate. Another possible explanation of the poorer growth with synthetic nitrogen is a higher deficiency of magnesium brought about by the liberal use of potassic manures without any replenishment of magnesium.

Modern glasshouses in the Lea Valley are similar in design to Nelson houses, but the English houses are always heated. A temperature of 65 degrees F. is maintained at night and during cold periods, which are frequent in the early English summer. Uniform temperature is considered most important for the satisfactory growth of tomatoes, and both too low temperatures and intense sunlight should be avoided.

Tomatoes in the Lea Valley are planted out in the glasshouses in the third week of March. The plants are stopped in August, but picking of fruit is continued in September and October. As soon as the fruit has been harvested the houses are dug and planted to lettuce, which occupy the houses during the winter. As a rule 16,000 plants are grown to each acre of glasshouse. The plants are spaced 14in. apart in the rows, which are separated by 18 and 27in., alternately, the wider spaces being used for picking the crop.

A noticeable feature of the English houses is the wider central aisle running the full length of the house. The final effect of the English spacing is a somewhat similar number of plants to that grown in Nelson houses.

## Developing Varieties

The Cheshunt Station has always taken a keen interest in testing varieties of tomatoes and in breeding improved strains or varieties. Potentate, which is now grown in Nelson, is one of the tomatoes produced at Cheshunt. At present Dr. Bewley is working on a mould-resistant variety which is called E.S.

**Potentate and Child's Special are perhaps the best of the glasshouse varieties grown at the station, and Radio and Queen show distinct promise for outside culture.**

## Blotchy Ripening

Lack of uniformity in the ripening of tomatoes has always been a difficulty in the English climate. The amount of blotchy ripening may vary in different seasons from 10 to 30 per cent. It is always worse, possibly because of shading, on the bottom two or three trusses than on those higher up the plants.

The condition known as blotchy ripening in England includes at least two different types of blotchiness on the skin of the tomato. The most common form is unequal colouring, not accompanied by necrosis in the tissue of the tomato; this form has been controlled to a considerable extent by the use of potassic manures. Another type of blotchy ripening is that associated with necrosis of the fibro-vascular system in the flesh of the tomato, and is similar to "cloud" in Nelson. As far as can be ascertained this type of blotchy ripening is not controlled by potassic manures. Sometimes necrosis in the tissue of the tomato occurs without the appearance of blotchiness of the fruit.

Dr. Bewley considers that the type of blotchy ripening known as cloud at Nelson is frequently associated with lack of fibrous roots and an undue proportion of deep roots. Though the Cheshunt Station has not made detailed investigations of cloud, he agreed with the results of Cawthron Institute investigations which showed that soil moisture was a factor of great importance in the incidence of the disorder.

## Greenback and Hard Core

According to workers in England, hard core is not synonymous with greenback. Tomatoes showing greenback may be affected with hard core, but the latter condition may occur apart from greenback. Little is known in England about the factors which produce hard core, but it is considered to be a nutritional disorder. In England emphasis is placed not only on a correct balance of manures but also on uniform conditions of culture. Intense sunlight, drought, and heavy winds all militate against good quality of tomato fruits.

**In the opinion of plant breeders, greenback in tomatoes could be eliminated in five years by crossing desirable varieties with Stoner's Exhibition, which does not show greenback characteristics.**

An interesting feature of experiments at Cheshunt is the testing of calico and transparent plastic materials with a view to the culture of outside tomatoes under semi-glasshouse conditions. It is claimed that in the English climate there would be great advantages, if costs were not too great, in the production in south-east England of early fruit of higher quality than that obtained from outside.

## John Innes Horticultural Station

The John Innes Horticultural Station is very widely known for its valuable work on genetics and plant breeding. Of no less importance to the nurserymen and amateur gardeners of England has been the standardisation of potting soil, investigations of compost, and the testing of many well-established practices in the conduct of nursery work. Though the work of the station covers a wide range of plants, including pip and small fruits, sweet corn, and flowers, considerable attention has been devoted to tomatoes, particularly the breeding of improved bush and dwarf plants and the production of tomatoes resistant to leaf mould.

## Standardisation of Potting Soil

A mixture of two parts of good loam—preferably obtained from a pasture field—one part of friable peat, and one part of coarse sand is recommended for all potting and nursery work. The loam should be prepared 6 months in advance by cutting turves 4in. thick and piling them 4ft. high. The peat should not contain a high percentage of loam, but should be easily broken into pieces up to ⅜in. in size. The sand should be a clean river sand of the coarser grades up to ⅛in. in diameter.

The loam must be sterilised by steam treatment in the usual way, and then the requisite fertilisers should be mixed with the sand. The soil, sand, and peat should then be mixed, resulting in a standard potting soil of wide use in all types of nursery work. The amount of fertilisers added to the sand depends on the purpose for which the soil is to be used. For the sowing of seeds smaller quantities of fertilisers are used than for potting plants.

## Nursery Technique

A number of experiments in nursery and garden practice has been carried out. The more important findings from these experiments are:—

The pricking out of young seedlings at the earliest possible time is desirable, and results in better growth and earlier fruiting than with seedlings pricked out late.

Better growth and earlier fruiting are obtained from tomato plants by potting them in 3½in. and 5in. pots than with smaller sizes.

Overhead watering of seed boxes and potted plants is superior to dipping the boxes and pots.

If weeds are removed by hand, hoeing of garden crops gives no particular advantage. Weeds in garden crops, particularly carrots and onions, greatly reduce yield. As the hoe is the best tool for removing weeds, hoeing must continue to be an important garden operation.

**The composting of tomato plants affected with virus does not destroy the virus. Though infection of tomato plants under outside conditions of culture is unlikely, such compost should not be used for glasshouse work or for potting soil.**

Compost suitable for nursery and garden work can be made from wheat straw, using appropriate amounts of ammonium sulphate and water during the process of rotting.

## Outdoor Varieties

Though the climate in south-east England is not very favourable for outside tomato culture, considerable success has been achieved at the John Innes Station by choosing varieties suitable for the soil and by timing seed sowing, potting, and transplanting to avoid any check to growth of the plants. Tomatoes are seldom planted out before late May or early June, resulting in a very short season for the plants. At the John Innes Station, Stoner's Exhibition, Harbinger, Market King, and Potentate have all given good results, and yields of 4 to 4.6lb. of ripe tomatoes a plant have been obtained.

Other work handled by the station includes the breeding of mould-resistant varieties of tomatoes and the classification and improvement of both dwarf and bush tomatoes.

## Effect of Deficiencies

Fruit studies comprise the major activities of Long Ashton Fruit Station, an important research centre, but tomatoes have been included in nutritional studies of a large number of crops. By sand culture experiments carried out in pots, the effect on the growth of tomatoes of omitting different plant foods is being closely studied.

Clear-cut deficiencies of nitrogen, phosphate, potash, and magnesium have been obtained in these experiments. Potash deficiency is usually the most serious in its effect and quickly results in the death of the plants. Magnesium deficiency causes a pronounced yellowing of the leaves, resulting finally in the death of tomato plants. In the early stages of magnesium deficiency fair growth of the plant is obtained and yellowing is not marked until fruiting begins. Phosphate deficiency results in a purple colour of the leaves and poor growth of the plants. Nitrogen starvation results in a yellowing and in serious cases complete failure of the tomato plants.

In England repeated sprays of 2 per cent. magnesium sulphate are recommended for tomatoes and other garden crops affected with magnesium deficiency.

## Growth-promoting Chemicals

In recent years investigators in both the United States of America and Great Britain have tested several chemicals which have peculiar growth-promoting qualities.

Alpha naphthalene acetic acid has been shown to be valuable in preventing pre-harvest drop of certain varieties of apples. At Long Ashton B-naphthoxy acetic acid and dichlorophenoxy acetic acid have been tested to ascertain their value in promoting set of tomatoes. B-naphthoxy acetic acid used at a concentration of 30 parts a million in water has given very good results, producing effective development of tomatoes even when the stamens of the flowers have been removed. Phenoxy-acetic acid, used in smaller concentrations, has likewise resulted in fruit set, but malformation of the tomatoes frequently occurred.

# Small Fruits Need a Good Start in Life

SMALL fruits can be grown successfully in New Zealand if stocks are planted in suitable sites and plantations are properly managed. Some aspects of the preparation of a site for small fruit growing are discussed in this article by J. P. Hudson, Horticulturist, Wellington, who has previously dealt with the choice of sites for raspberry growing.

THE initial preparation of the ground has an important effect on the subsequent life and health of a small fruit plantation. If the area is subject to waterlogging in wet weather, or to periodic flooding, it is folly to plant raspberries, gooseberries, or strawberries unless the land is first drained. Loganberries or black currants might succeed without the land being drained, as they are more tolerant of temporary waterlogging.

## Value of Drainage System

It may be necessary to install a permanent system of drainage before an area can be considered suitable for planting small fruits, but such a system should be put in only after the question has been carefully considered. Draining is expensive and not a good investment unless the drains do all that is expected of them. When properly sited, laid, and maintained, however, a drainage system may make the difference between the success and failure of a plantation.

Expert advice should always be sought before installing a system of drains to make sure that it is practicable and adequate. The system should be capable of disposing of surplus water at such a speed that the water-table never rises into the topsoil for more than a few hours at a time even in the wettest weather. It is hardly necessary to say that drains cannot work unless there is somewhere for the water to go when it reaches the outflow.

## Building up Humus Content

In a bulletin issued 45 years ago the Department of Agriculture stated that thorough and deep ploughing was essential in preparing soil for small fruit growing, and also emphasised that a heavy dressing of well-rotted farmyard manure could profitably be worked in at the same time. That advice is still sound, except that it is doubtful whether it would be profitable to apply heavy dressings of farmyard manure now in view of the very high prices ruling for that commodity.

**There is, however, no doubt about the need for applying some form of humus to build up the organic content of the soil before planting small fruits. If the soil is well drained, the next most important factor in the soil is its humus content.**

Time spent in growing and turning in one or preferably more green crops will be well repaid by the more rapid establishment of the plants when they are set out. It also pays to turn in, at the same time as the green crop, stack bottom, hedge trimmings, straw, roadside mowings, gorse or broom (if not too woody), or any other organic material that can be obtained, which helps to build up a high humus content, and is much easier to work into the soil before planting than afterward. Straw, stack bottom, hay, or semi-woody material tends temporarily to lock up nitrogen in the soil; such material should therefore be strewn with about ¾cwt. of sulphate of ammonia for each ton of dry material before it is worked into the soil to supply sufficient nitrogen for the needs of the bacteria which cause the material to change into humus.

## Care in Applying Lime

Little is known of the preferences of small fruits for acid or alkaline soils, but it is known that humus disappears more quickly in an alkaline than in an acid soil. It is also believed that raspberries and strawberries prefer a slightly acid soil, and there does not seem much point in applying lime to a small-fruit plantation unless the soil is strongly acid. An overdose of lime has been known to have a very damaging effect on raspberry plantations overseas, reducing the crop for several seasons after it has been applied.

Before planting small fruits it is advisable to have the soil tested to ascertain whether it is acid. If the soil is acid, it may be decided to apply lime, the quantity depending on the degree of acidity, as shown by the test, and on the texture of the soil. More lime is needed to produce a given effect on the acidity of a heavy clay soil than on a light sandy soil of similar acidity.

**In the present state of knowledge of the requirements of small fruits it seems best to bring acid soils nearly but not quite to a neutral state and to maintain them in that condition.**

Cultivation can hardly be too deep in preparing a site for small fruits, provided, of course, that the layers of soil are not transposed. That limits the depth of ploughing to the depth of the topsoil, as deeper ploughing would bring subsoil to the surface—a dangerous practice unless it is done very gradually.

**It was formerly common practice to plough as deep a furrow as practicable, and then run a subsoil plough down the bottom of each furrow before the next slice was turned over. That ensured that the soil was worked as deeply as possible without bringing subsoil to the surface or burying the fertile topsoil. The practice has much to commend it, but little subsoil ploughing seems to be done now.**

## Fruiting Habits of Raspberries

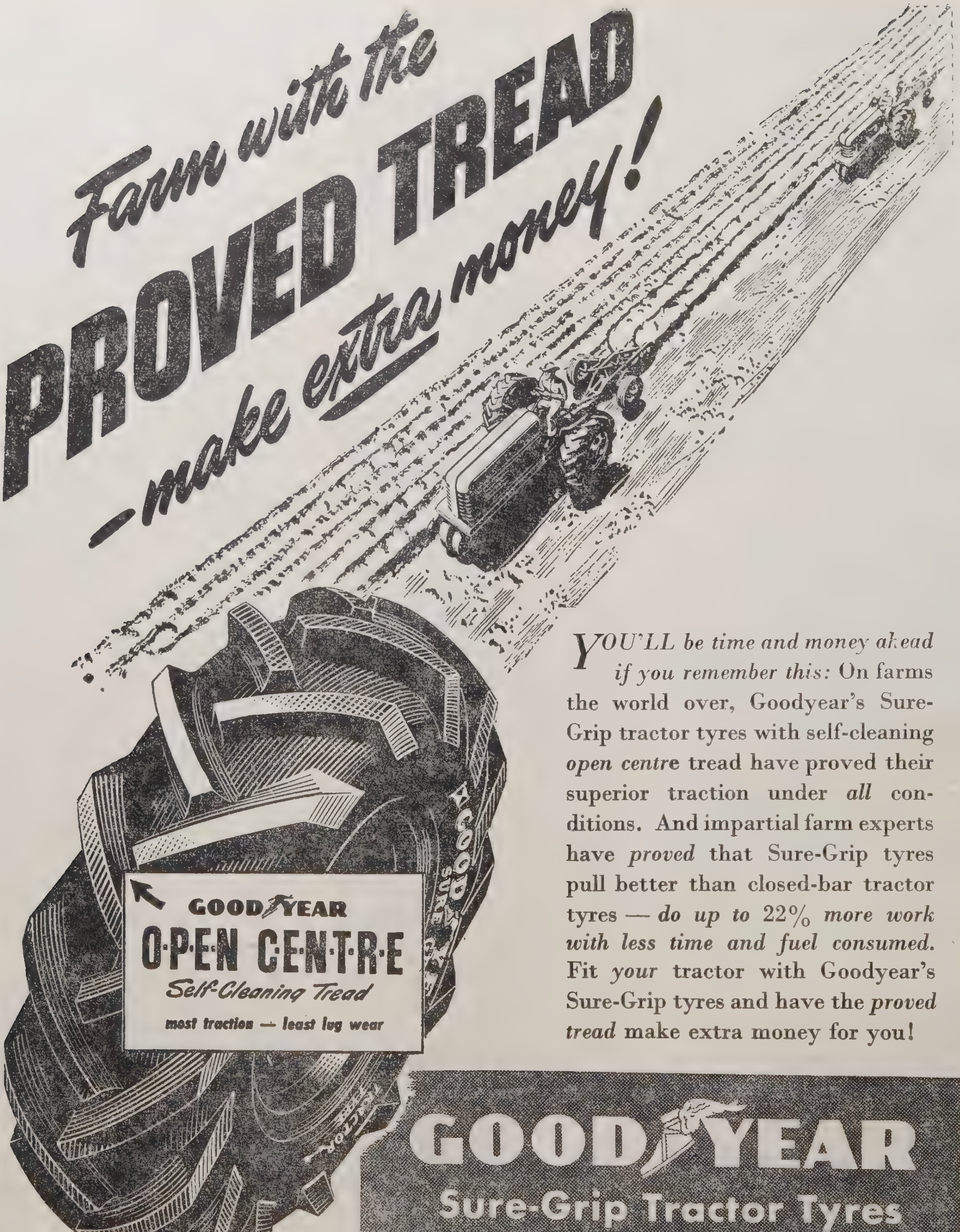
Raspberries usually bear their main crops on canes which grew from ground level last year and which die when they have produced their fruit.

Some varieties also produce fruit from laterals which grow in late summer on the most advanced new canes of the current season's growth. Berries produced in this way are usually so large and juicy that they are hard to pick and do not travel well, and are even regarded as a nuisance by growers, many of whom make little attempt to market these fruits. Lloyd George is a variety particularly prone to that behaviour in New Zealand, though it does not fruit in that way in Britain, where the variety originated. As canes which fruit thus will not fruit again the next year, they have to be cut out in the winter and represent a loss of potential fruiting canes. The view is sometimes expressed that hard tipping of dormant canes in winter will delay the emergence from the ground of new canes in spring, thus reducing the tendency of the new canes to form fruiting laterals, as it is the most forward of these canes which fruit in that way.

Lloyd George, and some other varieties, produce fruits in a third way—on the tips of the new canes in the late autumn. In favourable seasons this crop can be appreciable, but the fruits have little flavour and are soft and juicy, difficult to pick, and bad travellers. So far as is known, autumn fruiting on the tips of new canes does not interfere seriously with the following year's crop, and overseas these fruits, carefully picked into small chips, sometimes make handsome prices on the market as late dessert fruits.

## Pruning Raspberries

Raspberry canes which grew last season die after bearing this season's crop of fruits. The dead canes are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usually removed in the autumn or winter at the same time as the new canes are thinned and tipped. There is, however, much to be said for cutting out the old canes as soon as possible after the fruit has been picked, giving the new canes a better chance of ripening properly. Early pruning may also help to maintain the health of the plantation, as the young canes are less likely to be infected by diseases on the old ones.

**Old canes are often cut off an inch or two above the ground, but they are very much better cut off below the surface, as the stubs of old, dead canes are known to serve as centres from which infection of cane blight (wilt) can spread.**

## Summer Work on Raspberries

Cane blight is one of the most serious diseases of the raspberry in New Zealand, causing canes to wilt and die, usually just before the berries ripen. The fungus can live for several seasons in the stumps of dead canes, from which infection is spread; hence the importance of the early cutting out of fruiting canes just below ground level as soon as the fruit has been picked. All prunings should be collected and burned as soon as possible after pruning.

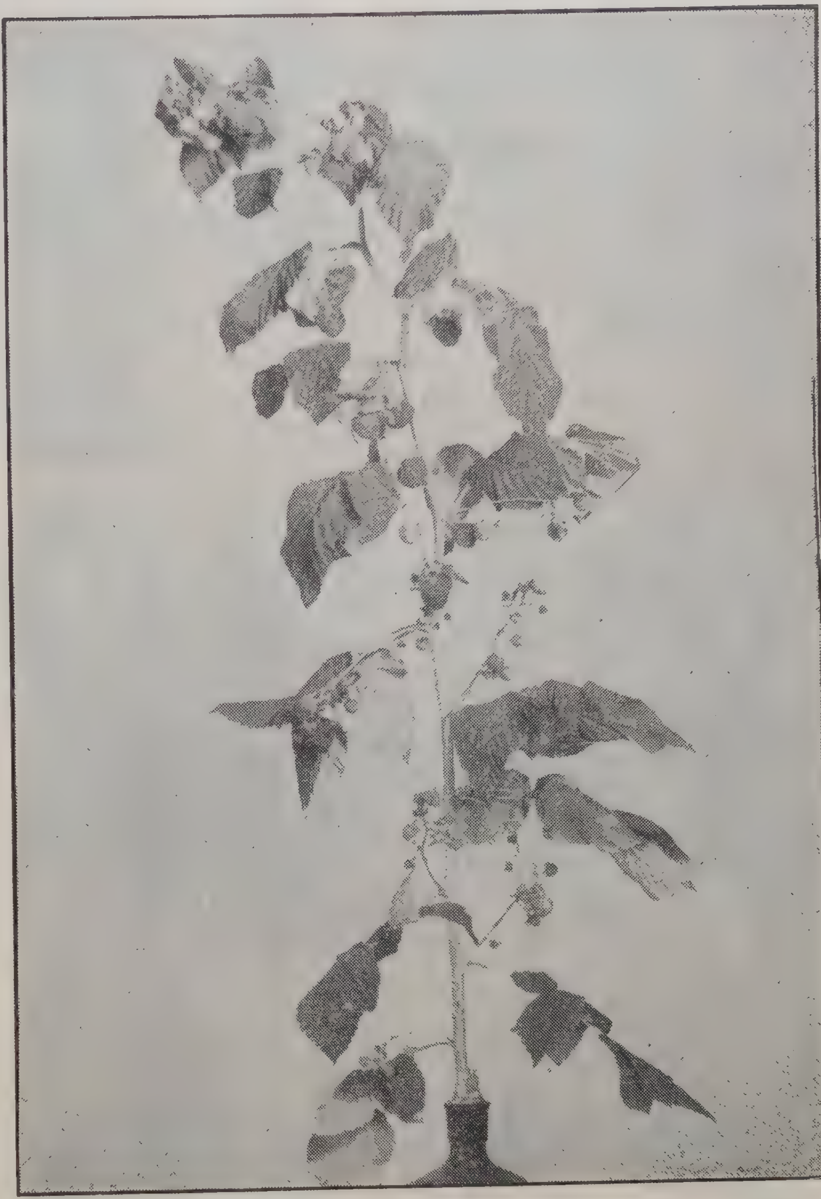
The foundation for a first-class crop next year will be laid if, after the prunings have been removed, the new canes are thoroughly sprayed with a 3-4-50 Bordeaux mixture to which has been added 2lb. of lead arsenate to each 100 gallons of spray. The canes should be drenched and an endeavour made to drive the spray well down into the axils of the leaves. A reasonable control of raspberry bud moth and cane spot on the young canes should be obtained by prompt removal of diseased and old canes and by the spray application after harvesting.

## Pruning Black Currants

Black currants will bear fruit next season on the new shoots which have grown this year. Pruning should therefore consist of removing each year, after the fruit has been picked, as much as possible of the wood which has borne fruit, leaving the new shoots which have grown this year to bear next season's fruit. If pruning is done as soon as the last of the fruit has been picked, the new growths will have a better chance of ripening before the winter.

Cutting out the shoots which have just fruited involves some sacrifice of new growths, as each branch cut off will have a new shoot at its end. That cannot be helped, and is necessary if the bush is to be kept fruitful. Very thin new shoots should also be removed, as well as branches which cross or hang too low on the outside of the bushes, or are damaged.

Old, neglected black currant bushes present a pruning problem. There are probably few new growths, and those which do exist are usually borne high up on the bush. If the bushes are more than 10 years old, trying to bring them back into production is probably not worth while. They should be grubbed out and replaced. If the bushes are worth saving, but are suffering from lack of proper attention to pruning, the best plan is to cut about two-thirds of the branches to within a few inches of the ground. This sacrifices most of the crop which would have been produced next year, but should ensure that the bushes produce ample new shoots, arising from near the base, to fruit in the following season. The old branches which are left this year should be cut back to ground level next year.



*[Green and Hahn Ltd.*

A heavy crop of Lloyd George raspberries borne on a cane of the current season's growth, photographed in February. Two feet of typical cane bore 12 sprays of fruit, totalling 103 berries. Thirty ripe berries, each nearly 1in. in diameter, weighed 4oz.

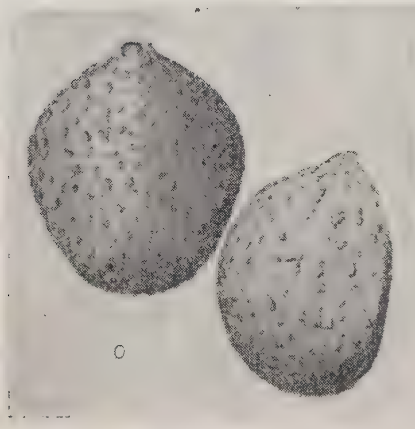
# Weed Seeds In Agricultural Seed

*(Tenth Series).*

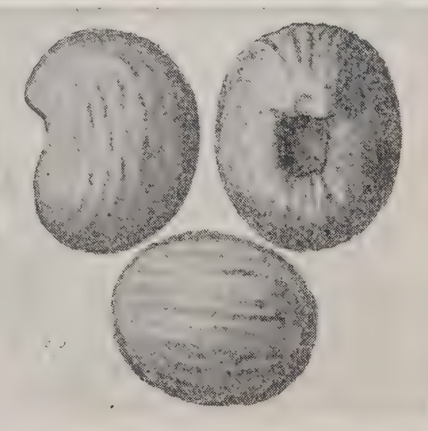
*By*

E. O. C. HYDE,

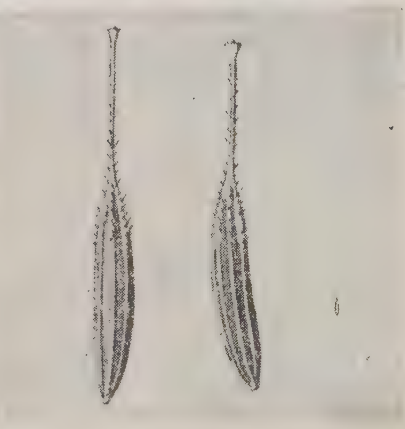
*Officer in Charge, Seed-testing Station, Palmerston North.*



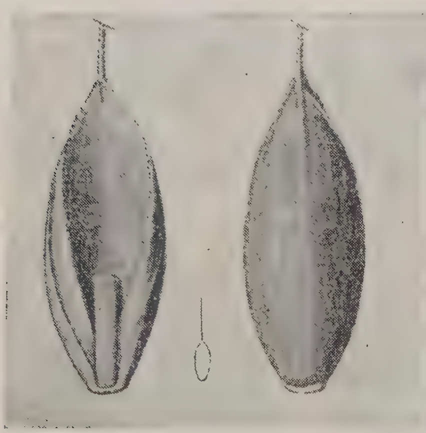
*STACHYS ARVENSIS:* WOUNDWORT. Colour dark brown to black. Occurs rarely in white and red clover. An annual weed of cultivated land.



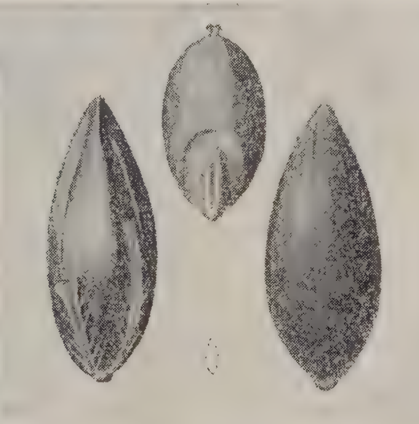
*GALIUM MOLLUGO:* HEDGE BEDSTRAW. Dark brown to black. Occurs with medium frequency in *Lotus major* and *Lotus hispidus*. A perennial weed of pastures.



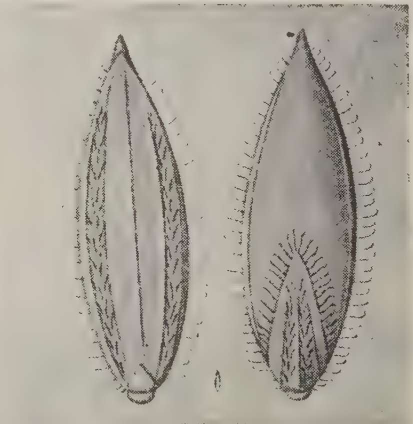
*CREPIS SETOSA:* HISPID HAWKWEED. Colour brown. Occurs infrequently in *Lotus major, Lotus hispidus,* and browntop. An annual pasture weed.



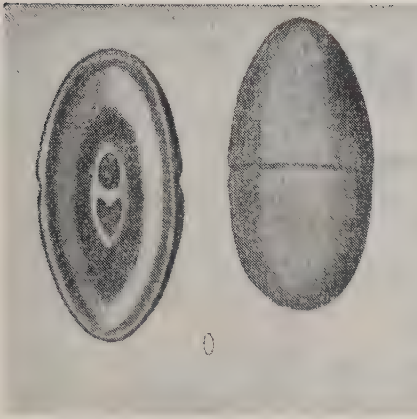
*LOLIUM TEMULENTUM:* DARNEL. Straw coloured. Occurs infrequently in barley, wheat, and oats. Classed as a primary noxious weed seed in Canada. Australia admits not more than 50 seeds a pound in cereals. An annual grass occurring as a weed in cereal crops. It is especially objectionable because the seed is poisonous.



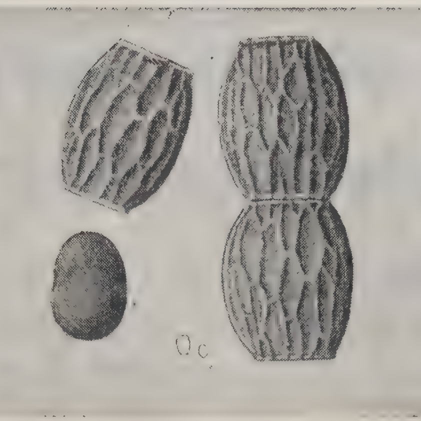
*SORGHUM HALEPENSE:* JOHNSON GRASS. Colour reddish-brown to black. Occurs infrequently in imported *Paspalum dilatatum* seed. Australia admits not more than five seeds an ounce. Classed as a noxious weed seed in the United States, and as a primary noxious weed seed in Canada. A perennial weed of cultivated land. It has not become established in New Zealand.



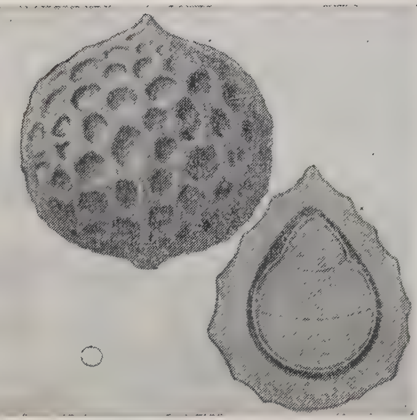
*DIGITARIA SANGUINALIS:* CRAB GRASS. Colour grey to brown, tinged with green and purple. Occurs frequently in seed of *Paspalum dilatatum*. Classed as a secondary noxious weed seed in Canada. Australia admits not more than 100 seeds an ounce. An annual weed of cultivated land.



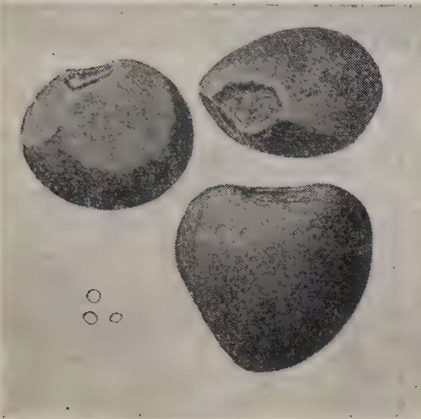
*PLANTAGO ARISTATA:* **BRACTED PLANTAIN.** Colour brown with light grey zones on the concave side. Occurs frequently in *Poa pratensis* imported from the United States. An annual weed which has become established in New Zealand, but is rare.



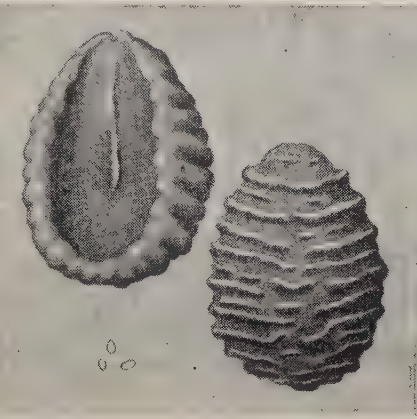
*ORNITHOPUS PERPUSILLUS:* **BIRDSFOOT.** Colour brown. Occurs infrequently in ryegrass. A perennial leguminous plant which may be regarded as a weed only where it displaces more productive species on fertile land.



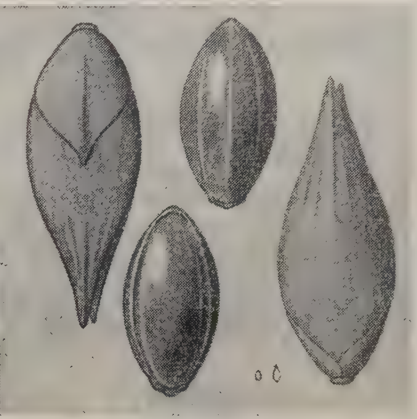
*NESLIA PANICULATA:* **BALL MUSTARD.** Colour brown. Occurs infrequently in imported grain. Classed as a secondary noxious weed seed in Canada. Australia admits not more than 100 seeds a pound. An annual weed which has not become established in New Zealand.



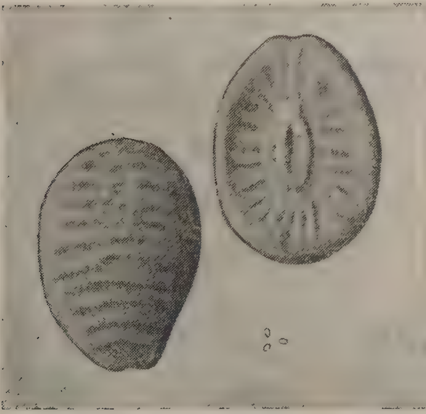
*ROMULEA ROSEA:* **ONION WEED.** Colour brown to black. Occurs with medium frequency in imported subterranean clover seed. Australia prohibits importation. A bulbous perennial weed not established in New Zealand.



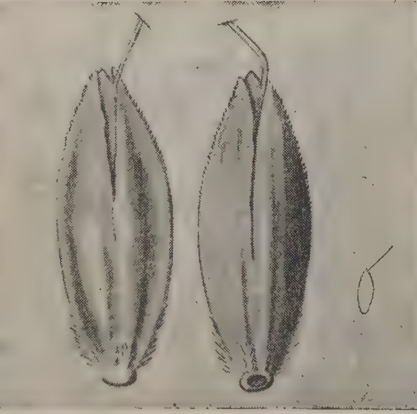
*VERONICA TOURNFORTII:* **BUXBAUM'S SPEEDWELL.** Colour yellow to brown. Occurs with medium frequency in white clover. An annual weed of cultivated land.



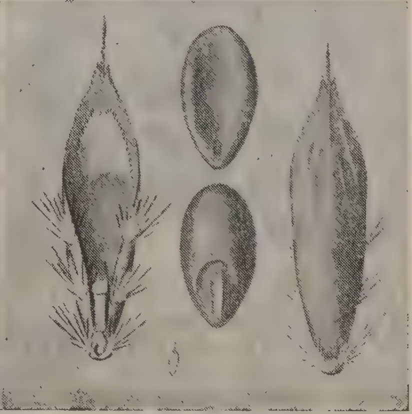
*PANICUM CAPILLARE:* **WITCHGRASS.** Glumes straw coloured with a purple tinge; lemma and palea grey. Occurs with medium frequency in *Lotus major* and *Lotus hispidus.* An annual grass found on cultivated land in the warmer districts.



*VERONICA ARVENSIS:* **FIELD SPEEDWELL.** Colour yellow to brown. Occurs frequently in yarrow and occasionally in white clover. An annual weed of pastures and cultivated land.



*ALOPECURUS MYOSUROIDES:* **SLENDER FOXTAIL.** Straw coloured. Occurs infrequently in ryegrass and cocksfoot. An insignificant annual weed of pastures.



*TRIODIA THOMPSONI:* Straw coloured. Occurs with medium frequency in chewings fescue and crested dogstail. A native perennial grass It is not harmful in either lawns or pastures.

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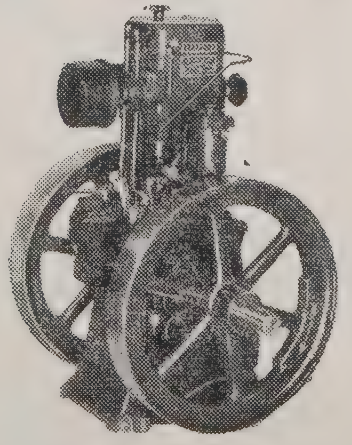

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# Uncapping Honey Combs

*By* I. W. FORSTER, *Apiary Instructor, Invercargill.*

THOUGH appliances used to uncap combs of honey have been steadily improved, uncapping has proved a difficult process to mechanise and for the most part remains an entirely manual operation, depending on the skill and strength of the operator for its speed and efficiency. Where suitable labour is not available uncapping often becomes a bottleneck in honey-house operations, especially now that modern transport, improved handling facilities, and up-to-date extractors have speeded up and simplified most of the other phases of honey extracting. This article outlines the principal uncapping appliances and methods in use today.

## Types of Knives

The plain uncapping knife and its steam-jacketed counterpart have been practically the standard uncapping appliances used for many years. From time to time knives heated by electric elements attached directly to the blade have been constructed, but in most cases the heat has not been steady enough to meet the intermittent demands on it. Knives so heated usually become too hot while not in contact with the combs and burn the adhering honey; when the blade is being drawn across a heavy comb it cools so rapidly that the knife becomes clogged before a full stroke can be made.

The beekeeper with only a small quantity of honey to extract will find the plain knife, used cold, convenient and suitable for his requirements. In the past uncapping work on a large scale was often carried out with a cold knife, especially where honey-houses were used at out-apiaries. A strong, skilful operator can achieve satisfactory results with a cold knife if the blade is kept sharp and the combs of honey are warm.

The plain knife can be warmed by immersing it in a container of hot water, but care should be taken to see that the knife is wiped thoroughly dry each time before it is brought into contact with the comb, as any excess of moisture in honey may cause fermentation.

The steam-heated knife has a copper jacket soldered to the blade and connected to a small boiler by a light rubber tube, a second tube being used to take away the exhaust. The circulation of steam keeps the blade continuously hot. The efficient performance of this type of knife is reflected in its wide popularity.

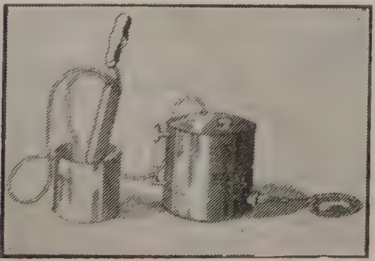

Fig. 1—An electric uncapping outfit.

## Uncapping Methods

A suitable rest is necessary to support the comb while it is being uncapped. That can be provided by fixing a wooden bar across the uncapping can with the sharpened end of a nail projecting from the centre of its upper surface. The comb to be uncapped should be placed with the middle of one end bar resting on the nail point and supported by placing the free hand of the operator on the other end bar (Fig. 2). The comb should then be pivoted first one way and then the other, and the outside of the top and bottom bar trimmed clean of adhering burr comb with a downward stroke of the knife. Should propolis be present in quantity, it should not be scraped into the uncapping can, as its dark colour and low melting point will lower the grade of the beeswax produced.

Uncapping knives are made in two lengths. The 10in. blade spans a full-depth frame and allows the complete side of a comb to be uncapped in one stroke; the 8in. blade requires two sweeps to each side. The uncapping procedure, therefore, is influenced by the size of the knife.

## Upward or Downward Stroke?

The operator also has the choice of using an upward or a downward stroke, or a combination of the two. The merits and demerits of each stroke may be summed up as follows:—

**Upstroke:** The knife is started at the bottom of the frame and brought upward with as much sawing motion as required to deal with the toughness of the comb. The frame should be leaned toward the knife to allow the cappings to drop clear as they are removed, at the same time keeping the thumb and fingers of the hand well back out of reach of the blade, or a painful cut may be received if the knife slips upward. With the upstroke the cutting edge is toward the operator, which seems to give greater control over the knife. That is an advantage when it is desired to take only a thin shaving of cappings or when dealing with partially-capped combs.

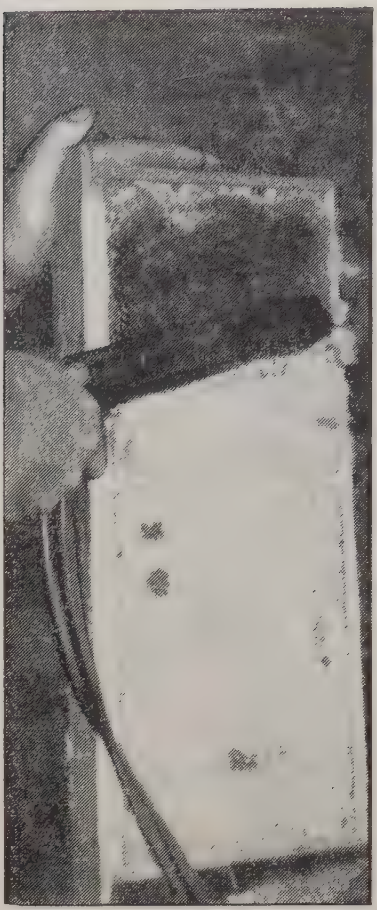

Fig. 2—Downstroke with steam-heated knife.

**Downstroke:** Starting at the top of the comb, the downstroke proceeds similarly to the upstroke, but the grip on the knife can be adjusted to advantage so that the thumb rests on the shank as in Fig. 2, giving a greater purchase and lessening the strain on the hand considerably. As the shank is inclined to become hot, it is usually necessary to insulate it with a binding of asbestos.

**The downstroke, though not so suitable for fine work, is faster and more straightforward when dealing with well-filled combs, as the knife is moving away from the hand supporting the comb, which gives greater confidence for a determined thrust. Also, as the cappings are detached they move downward ahead of the knife, so the comb can be held at any convenient**

**angle and not necessarily leaned forward as for the upstroke.**

If the operator prefers to take two sweeps at the side of a comb, an effective method is to cut down one side and up the other.

## Rosedale Uncapping Plane

An appliance which has rapidly gained favour since its introduction in this country some 10 or 12 years ago, the Rosedale uncapping plane is today about as popular as the uncapping knife as standard honey-house equipment.

The plane resembles a giant safety razor and works on a similar principle, being drawn across the comb in the same manner as a razor is drawn across the face. The blade, 4½in. wide, is made of high-grade copper, which metal allows a maximum of heat to be conducted to the cutting edge. The blade can be set to uncap thickly or thinly. On the back of the plane is a steel blade for the scraping of frame bars. Aluminium is the metal mainly used in the body of the plane, giving fair strength with a mininium of weight, so that the appliance balances nicely in the hand.

Though the usual method of using the uncapping plane is to hold the comb lengthwise and make two strokes from end bar to end bar, some beekeepers work by holding the comb on end and making 4 or 5 short sweeps from bottom to top bar and vice versa.

A variety of comb rests has been devised for use with the uncapping plane. In most cases the general principle is to balance the comb with the free hand on a flat frame with the near bottom corner of the frame resting against a projection, which will take the thrust and hold the comb stationary against the pull of the plane.

## Plane Uncapping Rack

Some beekeepers use a simply-constructed rack (Fig. 3) which takes the full weight of the comb during uncapping while allowing easy access to every part of it with the plane. The materials required are a piece of timber about 3in. by 1½in. and long enough to span the uncapping can, 4ft. of ½in. water pipe, 1 T-joint, and 2 elbows.

Attach the wooden bar across the uncapping can in the usual manner. Set a piece of pipe, long enough to bring the rack up to a comfortable working height, firmly in an upright position by inserting one end in a hole bored vertically in the wooden crosspiece. Ream out the inside of the downward arm of the T-joint so that it will slip tightly over the top end of the piece of pipe already fixed, but be free enough to be turned round at will. Into each arm of the T-joint screw a piece of pipe with an elbow at the end and turned upward.

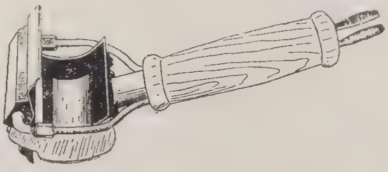

Fig. 4—Rosedale uncapping plane.

Take two pieces of pipe about 9½in. long and squeeze or hammer flat 2in. at one end of each. Cut a slot in the end of the flattened portion about ½in. wide and nine-tenths of an inch deep, and then thread the opposite ends ready to screw them into the elbows on the arms of the T.

To give the frame ample clearance, the bases of the uprights are set 1in. further apart than the tops. Hence it will be necessary to bend these two members so that when set in position they will each lean in sufficiently to bring the slotted top ends to the correct span for holding a frame of honey.

Hang the frame of honey by the top-bar lugs in the slots provided and place the free hand on the nearest bottom corner with the fingers behind the comb. It is then easy to swing out the frame to trim the bottom bar, and, as the whole rack pivots from the T-joint, both sides and top of the comb are easily accessible.

## Uncapping Machines

An uncapping machine consists of a stand on which a steam-heated blade is mounted horizontally with the cutting edge uppermost. The blade oscillates at about 800 strokes a minute and the operator, holding the comb by the end corners, thrusts it downward across the blade.

Uncapping machines operated by a treadle were illustrated in bee books as far back as 1886. The modern power-driven version has been available to the honey industry for many years, and it is difficult to say why this appliance has not been more widely adopted.

## Precautions

As in any operation which can be carried out by a variety of appliances and under varying conditions, each person will select the implements and methods that suit his requirements. Any of the methods or combinations of methods outlined will give satisfactory results if the following points are observed: —

**1. If possible uncap the honey while it is warm.**

**2. See that no moisture is introduced into the honey from wet appliances or from steam leaks.**

**3. Keep all cutting edges sharp whether the appliance is being used hot or cold.**

**4. Keep the thumb and fingers of the hand supporting the comb out of reach of the blade of the implement.**

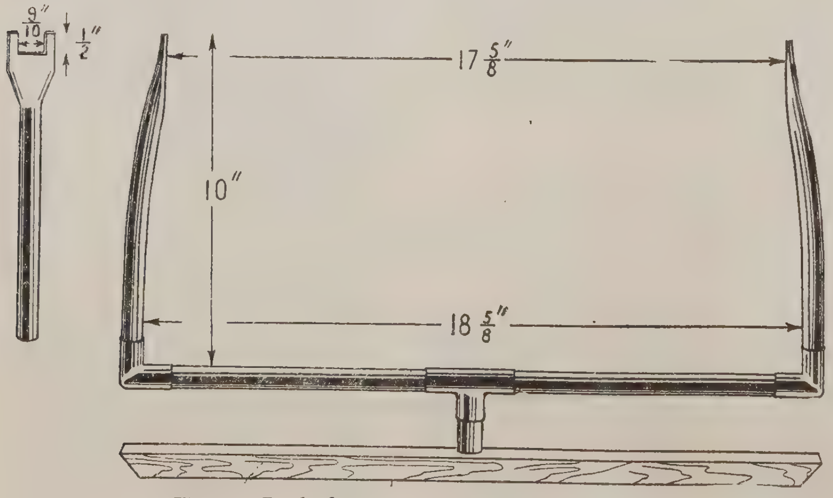

Fig. 3—Rack for use with uncapping plane.

### KILLING YOUR OWN MEAT.

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# NEW ZEALAND VETERINARY ASSOCIATION ANNUAL CONFERENCE

THE twenty-third annual conference of the New Zealand Veterinary Association was held in Wellington on November 20 and 21 last year and at the Animal Research Station, Wallaceville, on November 22. About 60 members from various parts of the Dominion attended.

In opening the conference, Mr. E. J. Fawcett, Director-General of Agriculture, said that the livestock industry was fundamental to the prosperity of New Zealand and that an efficient veterinary service was essential for the protection and the proper development of the industry. The New Zealand Veterinary Association had grown from 22 members in 1923 to more than 100 at present. The most rapid expansion had occurred in very recent years through the development of the Veterinary Club Movement, and there were now 41 members engaged by veterinary clubs compared with 11 in 1943.

The year 1946 was an important one in veterinary history in New Zealand, Mr. Fawcett continued, because of the passing of the Veterinary Services Act. The Act ensured the continuity of veterinary services for the farmer and at the same time afforded a measure of security for the profession. The Veterinary Club Movement, particularly, would be stabilised and extended by the provisions of the Act.

The number of veterinary surgeons in New Zealand was not considered adequate for a country so dependent on livestock, and the veterinary services committee had estimated a need for at least 250; other estimates were even higher. There were at present more than 60 young New Zealanders overseas studying veterinary science, most of them at Sydney University, and when they completed their 5 years of study they would become available to extend veterinary work in this country.

## Addresses by Members

Mr. A. H. Ward, Director of Herd Improvement, New Zealand Dairy Board, in an address on "Animal Breeding," outlined the present methods of breeding dairy stock overseas and in New Zealand. In view of the importance of combining disease resistance, fertility, and length of working life with producing qualities, emphasis was rapidly swinging to the use of records for cows and to the progeny test for bulls. Denmark had demonstrated the success of this method, which had been applied since early in the present century, as she now had the highest production per cow of any major dairying country.

Mr. Ward stressed the need for a modern outlook on pedigree breeding and emphasised the role of the veterinary surgeon in assisting breeders with advice on sound methods. Several new methods were now being used in an attempt to speed up improvement of dairy cattle overseas, the chief of these being artificial insemination. Because it would not be possible to show the farmer any considerable saving in cost, it was not likely that this method would become commercially widespread in New Zealand, but it was of considerable importance to the pedigree breeder in making the best use of outstanding bulls in the Dominion.

Dr. C. P. McMeekan, Superintendent of the Ruakura Animal Research Station, speaking on "Pasture as a Food for Cattle and Sheep in New Zealand," pointed out the high production of good fodder from New Zealand pastures that was obtained under proper management and control. Seasonal variations in yield occurred, but generally with both cattle and sheep the periods of highest yield coincided with the highest demands for food for production of milk or fat lambs. Excess production could be conserved for use in leaner seasons of the year.

A paper read by Dr. I. J. Cunningham, Superintendent, Animal Research Station, Wallaceville, on "Are Mineral Licks Necessary in New Zealand?" appeared in the January issue of the "Journal" Messrs. A. D. M. G. Laing, I. G. McIntosh, and J. M. Stewart described the occurrence of nitrite poisoning in stock fed mangolds, variegated thistle, or oat sheaf hay; Mr. J. G. Gerring explained an unusually high incidence of actino-bacillosis on new pastures grown on deeply-burnt peat; Messrs. W. M. Webster and R. W. Roach described the treatment of mastitis in dairy cows by penicillin; Dr. C. V. Gomez outlined some of the pitfalls of veterinary practice.

## Field Day at Wallaceville

The programme at Wallaceville on November 22 included movie films showing research work carried on at Wallaceville, other special films, and lecturettes by members of the station staff. The lecturettes covered work on "trace" elements (cobalt, copper, or iodine, which occur in fodder and in animals in minute amounts but which nevertheless are of enormous importance); the use of radio-active elements in research on animal disease; poultry diseases in New Zealand; and a brief review of bee and honey research.

Members of the Association spent the afternoon examining the many interesting and instructive displays at Wallaceville illustrating the work being carried out there.

## Election of Officers

The following officers were elected for the ensuing year: President, Mr. J. Hill-Motion, Palmerston North; vice-presidents, Dr. J. F. Filmer, Wellington, and Mr. J. P. James, Ruakura; council, Dr. I. J. Cunningham, Wallaceville, Mr. A. Leslie, Eltham, and Mr. G. MacDonald, Cambridge; hon. secretary, Mr. L. W. N. Fitch, Wallaceville; hon. treasurer, Mr. J B. Swan, Wallaceville; editor, Dr. I. J. Cunningham, Wallaceville. Mr. G. MacDonald, veterinary surgeon to the Cambridge Veterinary Club, was appointed a representative of the Association on the Veterinary Services Council.

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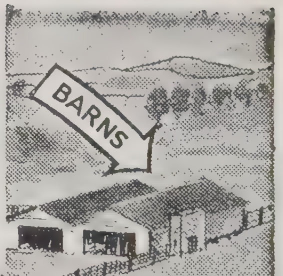

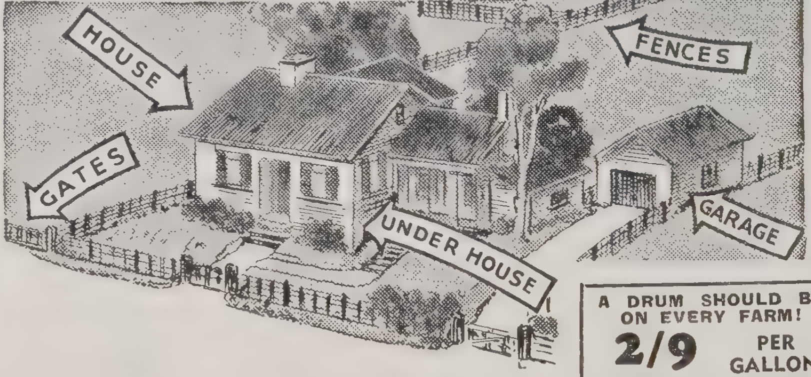

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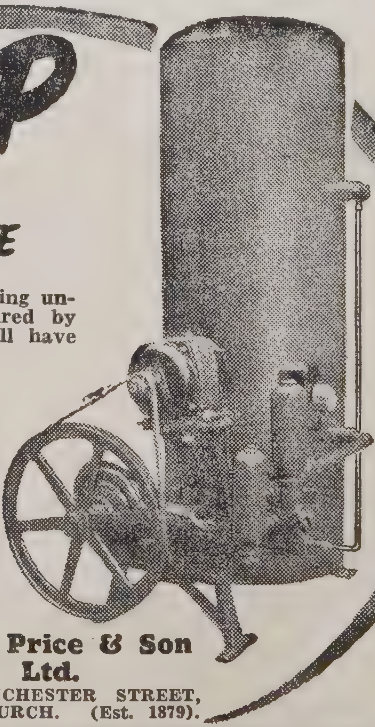

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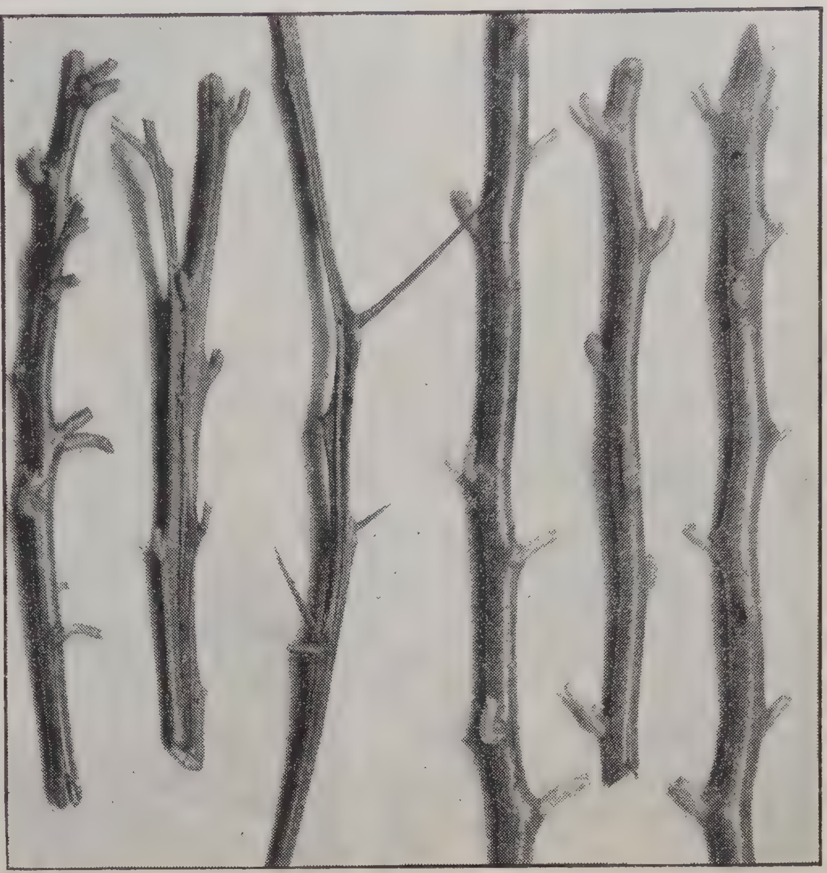
# BUDDING OF CITRUS TREES

*By* J. E. HUME,
*Orchard Instructor, Tauranga.*

BUDDING of citrus trees may be done over a fairly long period, usually from November to March, if the weather is reasonably good for steady growth. During this period the sap should be flowing freely in the stocks. For general purposes February is the most suitable month, as the buds will then remain dormant throughout the winter, while those inserted earlier will start to grow before winter and be more subject to frost injury. Another disadvantage of early budding is the difficulty of obtaining suitable buds, as many which would be otherwise suitable will be making growth.

**GOOD bud-sticks are well rounded and mature, about lead pencil thickness, not more than 1 year old, and taken from healthy trees that have carried good crops of fruit, true to type, for several years. Avoid taking buds from suckers, water shoots, or any wood showing malformations or excessive thorns.**



Left—Unsuitable budwood. Right—Suitable types.

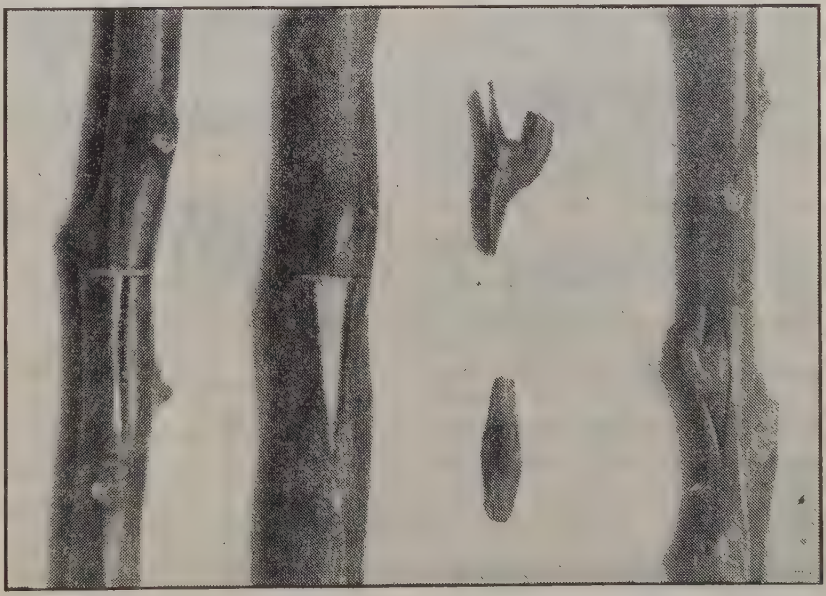
## Selection of Buds

The most suitable bud-sticks are dark green, with pale-green angular tips. The tips should not be used, nor should the base buds on the sticks, because they are invariably weaker. Plump buds taken from between these two portions should give the best results. On removal of the bud-sticks from the tree the leaves should be cut off, but a part of the stalk or petiole by which to handle the bud should be left. It is preferable to do all trimming of the sticks in the shade and to keep the budwood wrapped in damp sacking, as drying out will affect it detrimentally.

If supplies of budwood are convenient to the nursery, gathering it at least daily is preferable. Any which has to be transported a considerable distance should be carefully wrapped in damp cloth or sphagnum moss.

## Preparation of Stock

Only good strong stocks should be budded and any thin or small ones discarded.



From left to right—A T-shaped incision made through the bark; the bark slightly lifted to allow for entry of the bud shield; side and front view of a bud shield; the bud fitting snugly in the stock ready for tying.

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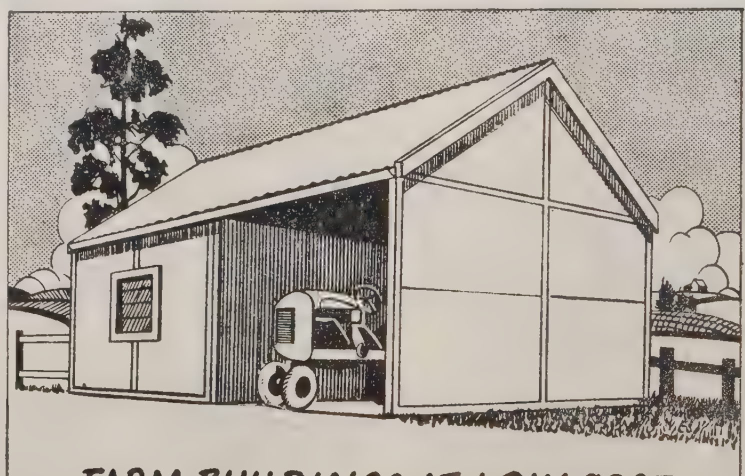

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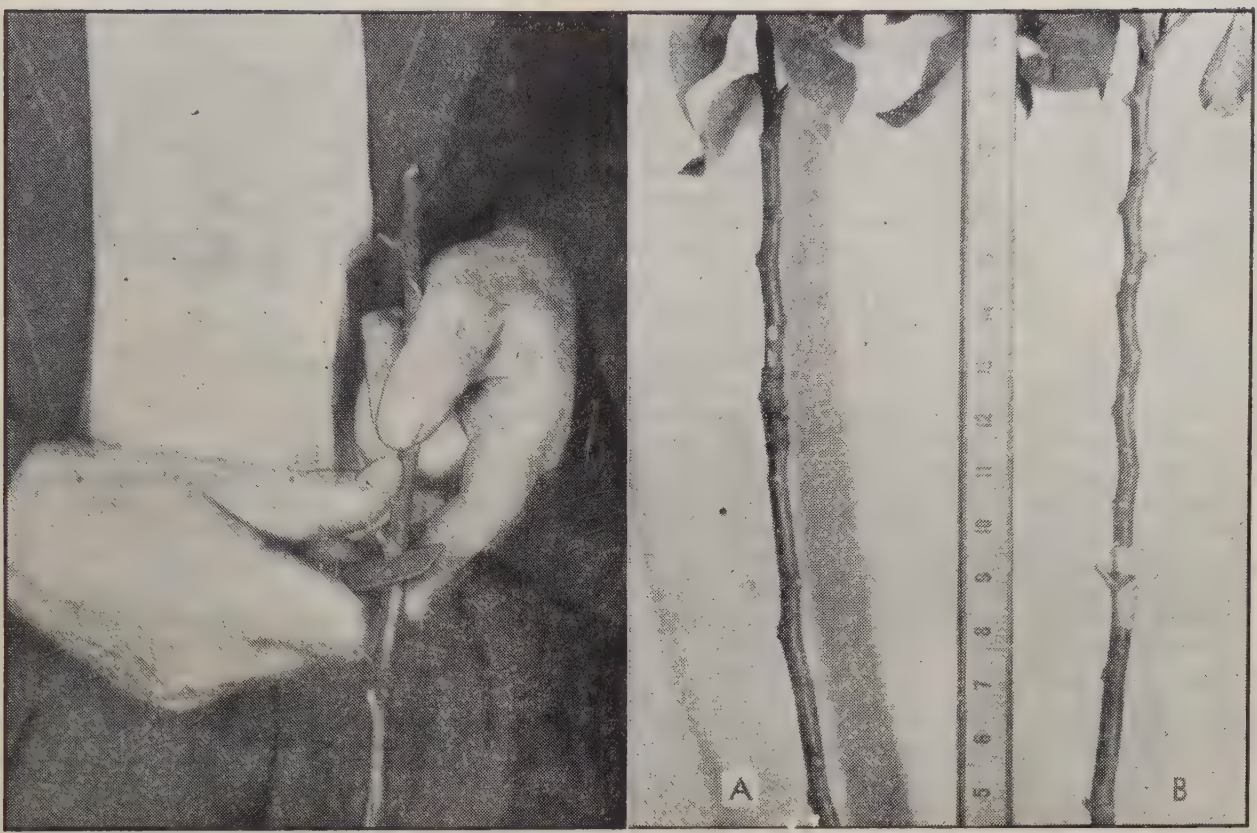

Left—Cutting a bud shield from the stick. Right—Budding operations completed. A, a lemon bud firmly held by a rubber strip; B, an orange bud tied with raffia.

The buds of sweet orange and grapefruit should be inserted at least 9in. above the ground; for standard lemons at least 12in. is advisable. To avoid interference with the operation, clearing the stocks of all leaves and shoots up to a little above the point of budding is a good practice.

### Inserting the Bud

**Budding must be done neatly and quickly to prevent drying out of the bud shield, and always with the utmost care to avoid damaging the bud. Inserting the bud on the shaded side of the stock is best.**

With a sharp knife, an upright incision about 1in. long and the depth of the bark is made in the stock; across the top of this and at right angles to it a second cut ½in. long is made, forming a letter T. With the point of the knife or the shaped end of a proper budding knife the edges of the upright cut are opened out for about ½in. from the top, baring the white under surface (cambium layer) and allowing for the entry of the bud shield.

**WEEDS**

Weeds, their means of dispersal, and cost and methods of control are dealt with in Bulletin 202, "Weeds," which is available free from offices of the Department of Agriculture. Much farm land has deteriorated through lack of control of weeds, and this bulletin contains invaluable information on the recognition of weeds and their properties.

### RULES FOR BUDDING

**Use budwood only from specially-selected, proven trees.**

**Carry out all operations with speed and precision.**

**Take particular care with tying to exclude air and moisture.**

In taking a bud the bud-stick is held with the upper end toward the operator and the shield shaved off by a slicing motion of the knife, starting ½in. below the bud and finishing the same distance above. The bud can be prevented from falling by holding it on the blade with the thumb. The bud is handled by the small piece of leaf petiole which was left on, inserted right way up in the incision in the stock, and slid gently down until it fits snugly into position.

The operation is completed by tying with suitable material such as raffia, specially-prepared budding tape, or strips of rubber, starting the tie at the bottom. The tie should be firm to exclude air and moisture, but the bud must not be covered.

### Treatment After Budding

The buds should be examined 2 or 3 weeks after budding and the ties loosened or cut on the opposite side to the bud to avoid restriction of the flow of sap. If budding tape or rubber strips have been used, they may be left unattended longer.

During this inspection it may be found that some buds have failed to "take"; the petiole will probably have shrivelled and turned brown but still be adhering to the shield. If the stock is still in a suitable condition, another bud may be inserted higher or lower.

Buds that are healthy and growing can be recognised by their green appearance. If the petiole is still attached, it will be pale and will drop off at the slightest touch.

# *Responsibilities of Vendors Under Stock Foods Act*

THE Stock Foods Act, 1946, passed during the most recent session of Parliament, will come into operation on June 1. Its purpose is to require vendors of stock foods to disclose to buyers, on an invoice or a label supplied at the time of sale, particulars of the ingredients of any mixed food and its composition so that buyers can assess its value in comparison with other stock foods on the market.

A STOCK food is defined as any substance or preparation manufactured or prepared in whole or in part from one or more kind of grain, seed, plant, oil, juice, meat, fish, or other source and ordinarily used as food for stock. The term stock means cattle, sheep, horses, pigs, and poultry. The proprietor of a stock food is its manufacturer or importer. The Act does not apply to sales of stock foods to persons who buy for their own use and supply the materials for manufacture or preparation, or give written instructions setting out the ingredients and proportions.

## Branding of Packages

Packages of stock food must be branded or labelled with:

1. The name and place of business of the proprietor;
2. The name and trade mark (if any) of the stock food;
3. The gross weight of the package.

A meat meal containing less than 60 per cent. of crude protein is deemed to be a meat-and-bone meal and the packages must be branded or labelled as meat-and-bone meal, but a tolerance of 3 per cent. below the stipulated percentage is allowed. The name to be branded or labelled on packages of bran or pollard must include a description of the grain or seed from which the bran or pollard was derived—for example, wheaten bran or oaten pollard.

## Particulars on Invoices

When a stock food is sold the vendor must supply the buyer with an invoice showing:

1. The vendor's name and place of business;
2. The name and trade mark (if any) of the stock food;
3. The number of packages being sold;
4. The gross weight of each package;
5. In the case of mixed stock foods, the name of each ingredient;
6. Particulars of the chemical composition as stipulated in the first schedule to the Act.

**In the case of a feeding oil the invoice must also state whether the feeding oil is recommended for feeding to poultry.**

**If all the particulars to be stated in the invoice are clearly branded or labelled on the packages containing the stock food, it is not necessary to supply an invoice containing the same particulars.**

A reseller is protected from liability for a breach of the provisions for branding or labelling packages if the stock food is delivered by his wholesaler directly to the reseller's customer. A typical example is that of a dairy company buying stock foods for its suppliers, the goods being consigned directly to the suppliers by the wholesaler.

The branding and labelling particulars or the supplying of invoices are not required when stock foods are sold retail in small lots, but the buyer has the right to inspect the invoice or label supplied to the reseller when he bought the food for resale.

The invoice or label containing the required particulars has effect as a warranty by a vendor to a buyer that:

1. The stock food contains only the ingredients specified;
2. It is suitable for use as food for stock or for the kind of stock specified;
3. The particulars of the number of packages, gross weight, and chemical composition are correct.

## Inspection and Analysis

All Inspectors of Stock are deemed to be inspectors under the Stock Foods Act and are empowered to enter the premises of a vendor and take samples of stock foods for analysis. Samples may also be taken for analysis at the request of a buyer, in which case the vendor has the right to be present when the sample is taken. The inspector must be satisfied that the packages containing the stock food are sound, have been properly stored, and have not been opened or tampered with.

The analyst must compare his analysis with the particulars in the invoice or label supplied by the vendor, and if there is a discrepancy, the analyst must state in his certificate whether the discrepancy, after allowing for any prescribed limit of variation, would be materially to the prejudice of a buyer.

If the result of an analysis made at a buyer's request shows that the stock food is not materially at variance with the particulars in the invoice or label, the vendor is entitled to recover from the buyer any reasonable expenses incurred by him in attending when the sample was taken.

**The results of any analysis made under the Act may be published by the Director-General of Agriculture if in his opinion publication is necessary for the protection of buyers or is otherwise in the public interest.**

## Offences under the Act

The following special offences are created by the Act:

1. Selling or offering for sale a stock food which is not in all material respects of the standard of quality, purity, and composition prescribed by regulations;
2. Selling or offering for sale a stock food containing any ingredient injurious to the health of stock, unless the vendor is able to prove that he did not know and could not with reasonable care have known that the food contained an injurious ingredient;
3. Selling or offering for sale a feeding oil containing any mineral oil, unless the vendor is able to prove that he did not know and could not with reasonable care have known that the feeding oil contained mineral oil;
4. Supplying an invoice or label containing a false or misleading statement materially prejudicial to a buyer of the stock food to which the statement relates;
5. Tampering with samples of stock foods taken in pursuance of the Act;
6. Publishing a circular or advertisement containing a false or misleading statement about the nature, quality, purity, or composition of a stock food that would be materially prejudicial to a buyer.

## "Injurious Ingredients"

The "injurious ingredients" mentioned in paragraph 2 include:

All poisonous substances except those naturally present in the material from which the stock food is prepared;

Salts soluble in water if present in proportions likely to injure the health of stock;

Sand, siliceous matter, or other insoluble mineral matter, whether or not naturally associated with an ingredient of the stock food, but where naturally associated if present in greater proportion than the maximum that may be expected to be the result of natural association.

# Facial Eczema Precautions
## EFFECT OF RESTRICTED GRAZING ON LAMBING

**IN the prevention of facial eczema the greatest difficulty is experienced by the farmer whose pastures are all composed largely of ryegrass and white clover. This type of pasture is known to be extremely dangerous during facial eczema periods and its consumption must be reduced to a minimum. Experience in 1938 and other bad facial eczema years showed that even limited periods of grazing on that type of pasture may not be safe. During the period of rapid growth in autumns which follow dry summers it is therefore necessary that sheep should be concentrated at the rate of not fewer than 100 to the acre and fed such supplements as are available. Many farmers have expressed the fear that such treatment may seriously affect the health of sheep, and in particular may have disastrous effects on the lambing of ewes being mated at the time the restricted grazing is imposed. The results of the experiment reported in this article should help to allay such fears. It was conducted on the Department's Facial Eczema Research Farm at Manutuke, near Gisborne.**

IN the autumn of 1946 the drought broke in the Gisborne district on March 2 and 2.5in. of rain fell during the next four days. As conditions after this rain could have led to an outbreak of facial eczema it was decided to institute a programme of restricted grazing.

An acre of turnips which had been grazed previously by lambs but still had some fair grazing left was available, and 155 4-tooth ewes and 3 Southdown and 3 Romney rams were confined in this field on March 8. On the next day they were given a change to Japanese millet and on March 10 and 11 were again grazing the turnips, at the end of which time the crop had been thoroughly eaten out. As the area of Japanese millet available was not great, rationing became necessary. On March 12 the ewes and rams were confined to a 1-acre pasture paddock, which was eaten bare within 24 hours. They were given 1½ hours' grazing each morning on Japanese millet and 1lb. of hay a head each afternoon until the danger period was past. On March 20 the ewes and rams were returned to pasture.

Probably because the rain was accompanied by a cold change and was followed by strong winds, no facial eczema developed anywhere in the district, so the effect of the restricted grazing on the incidence of facial eczema could not be estimated. Judging by the general condition of the ewes and rams, no ill effects were caused by the treatment.

To determine the effect of the restricted grazing on the subsequent lambing it was decided to keep a count of the lambs born each day. As the rams were put with the flock on March 8, and the gestation period is about 147 days, the first lambs were expected about August 2. The table shows the lambing figures and the treatment of the ewes at the time of tupping.

| Date of upping March | Grazing at time of tupping | Lambing dates | Number of lambs |
|---|---|---|---|
| | Before | August 2 | 4 |
| 8 | Turnips | August 2 | 1 |
| 9 | Japanese millet | August 3 | 3 |
| 10 | Turnips | August 4 | 1 |
| 11 | Turnips | August 5 | 1 |
| 12 | Confined to a 1-acre pasture paddock and allowed 1½ hours' grazing each morning and Japanese millet with 1lb. of lucerne hay a head in the afternoons | August 6 | 3 |
| 13 | | August 7 | 3 |
| 14 | | August 8 | 6 |
| 15 | | August 9 | 2 |
| 16 | | August 10 | 0 |
| 17 | | August 11 | 4 |
| 18 | | August 12 | 2 |
| 19 | | August 13 | 1 |
| 20 | Returned to normal grazing | August 14 | 3 |
| | | August 15 | 4 |
| | | August 16 | 5 |
| | | August 17 | 7 |
| | | August 18 | 4 |
| | | August 19 | 12 |
| | | August 20 | 8 |
| | | August 21 | 14 |
| | | August 22 | 12 |
| | | August 23 | 14 |
| | | August 24 | 3 |
| | | August 25 | 4 |
| | | August 26 | 1 |
| | | August 27 | 3 |
| | | August 28 | 1 |
| | | September 3-20 | 21 |

| | |
|---|---|
| Lambs born dead or died within first week .. | 25 (16.2 per cent.) |
| Lambs marked .. .. | 125 (80.6 per cent.) |
| Ewes died or killed during lambing .. .. .. | 6 (3.8 per cent.) |
| Dry ewes .. .. .. | 8 (5.1 per cent.) |

It happened that the rams were put out on the day on which precautionary grazing was begun. Up to August 5 the lambs born were probably from ewes tupped while grazing turnips and Japanese millet. Lambs born between August 6 and 13 would be from ewes tupped during the period of restricted grazing, and 21 lambs were born during that period, an average of 2.6 a day. Lambs born after August 13 would probably be from ewes tupped after they had returned to the pasture.

It is interesting to observe the marked increase in the rate of lambing between August 19 and 23; during that period 60 lambs were born, an average of 12 a day. That was almost certainly the result of the "flushing" effect of the good pasture on both ewes and rams, which apparently occurred 5 days after their return to unrestricted grazing. In any case that "flushing" effect would probably not have occurred before March 16, as March 11 was the first day on which it was possible to collect pasture with the motor mower. Therefore, it may be argued that the peak of lambing was not delayed by more than 9 days. The last lamb was born on September 20, and only 8 ewes (5.1 per cent.) proved empty.

**It is not considered that the heavy mortality of young lambs was caused by the treatment, as it was observed on many farms throughout the district and has occurred to an alarming extent, during the past few years at least, in many districts.**

It is realised that many farmers do not grow crops for sheep feed and therefore may have to depend on hay to maintain sheep during the period of restricted grazing. An experiment to test the effect of this treatment on ewes will be conducted during the coming autumn. During the autumn of 1945 70 2-tooth wethers were confined in a 1-acre paddock on March 4, 56 lambs were added on March 12, and both wethers and lambs remained in the paddock until March 18. About 1lb. of lucerne hay each was fed daily from March 12. None of the wethers or lambs appeared to suffer any ill effect beyond some loss of condition. Forty-two of the wethers were killed at the works on April 17, having been grazed on pasture after their release from confinement on March 19.

**It is not yet possible to offer experimental proof that the type of restricted grazing described will prevent facial eczema. It is, however, a reasonable precaution and probably the best available to many farmers. The experiment described indicates that it is not attended by any serious effects on the health of sheep or the subsequent lambing of ewes.**

*J. E. V. SIMPSON,*
*Officer-in-Charge, Facial Eczema Research Farm, Manutuke.*

# NEW ZEALAND LAMBING ESTIMATES FOR 1946

## *Considerable Decline in Percentages and Totals*

By the Livestock Division

THE number of lambs tailed in New Zealand in 1946 is likely to fall considerably below 1945's record figure of more than nineteen and a half million. The estimated lambing percentage for the Dominion is 89.54, compared with the record figure of 92.64 per cent. for 1945.

The results of the severe drought which affected many North Island sheep districts during last February, March, and April are reflected in the much more pronounced difference between the North and South Island estimates. The South Island figure is 3.77 per cent. higher, compared with .19 per cent. in 1945.

| County. | Breeding Ewes (as at 1945). | Estimated Percentage of Lambs. | Estimated Number of Lambs. |
|---|---|---|---|
| **AUCKLAND DISTRICT.** | | | |
| Mangonui | 33,967 | 83.2 | 28,261 |
| Whangaroa | 14,386 | 85.6 | 12,314 |
| Bay of Islands | 61,325 | 86.7 | 53,169 |
| Hokianga | 54,339 | 79.0 | 42,928 |
| Whangarei | 93,494 | 83.1 | 77,694 |
| Otamatea | 78,379 | 83.8 | 65,682 |
| Hobson | 76,598 | 86.9 | 66,564 |
| Rodney | 93,815 | 83.8 | 78,617 |
| Great Barrier | 7,209 | 68.0 | 4,902 |
| Waitemata | 78,365 | 85.3 | 66,845 |
| Eden | 2,653 | 89.8 | 2,382 |
| Manukau | 65,035 | 86.1 | 55,995 |
| Franklin | 106,839 | 94.7 | 101,177 |
| Coromandel | 36,790 | 76.4 | 28,108 |
| Thames | 8,926 | 78.6 | 7,016 |
| Hauraki Plains | 13,785 | 91.9 | 12,668 |
| Ohinemuri | 13,185 | 88.8 | 11,708 |
| Waikato | 165,985 | 93.7 | 155,528 |
| Raglan | 398,719 | 85.2 | 339,709 |
| Waipa | 190,160 | 93.0 | 176,849 |
| Piako | 142,649 | 96.2 | 137,228 |
| Matamata | 255,373 | 91.7 | 234,177 |
| Rotorua | 88,921 | 100.0 | 88,921 |
| Taupo | 23,903 | 90.1 | 21,537 |
| Taumarunui | 101,932 | 84.0 | 85,623 |
| Kawhia | 66,326 | 91.0 | 60,357 |
| Otorohanga | 140,743 | 91.0 | 128,076 |
| Waitomo | 350,741 | 79.0 | 277,085 |
| Ohura | 106,446 | 88.0 | 93,672 |
| Kaitieke | 66,860 | 89.0 | 59,505 |
| Tauranga | 132,850 | 94.0 | 124,879 |
| Whakatane | 45,480 | 88.0 | 40,022 |
| Opotiki | 53,190 | 83.0 | 44,148 |
| Totals | 3,169,368 | 87.82 | 2,783,346 |

| County. | Breeding Ewes (as at 1945). | Estimated Percentage of Lambs. | Estimated Number of Lambs |
|---|---|---|---|
| **EAST COAST-HAWKE'S BAY DISTRICT.** | | | |
| Matakaoa | 59,868 | 81.2 | 48,613 |
| Waiapu | 237,452 | 75.7 | 179,751 |
| Uawa | 121,671 | 83.0 | 100,987 |
| Cook | 435,451 | 83.8 | 364,908 |
| Waikohu | 345,761 | 83.8 | 289,748 |
| Wairoa | 399,084 | 84.9 | 338,822 |
| Hawke's Bay | 952,325 | 80.3 | 764,717 |
| Waipawa | 420,488 | 87.8 | 369,188 |
| Waipukurau | 142,112 | 82.3 | 116,958 |
| Patangata | 480,483 | 84.8 | 407,450 |
| Weber | 51,399 | 87.3 | 44,871 |
| Dannevirke | 287,670 | 92.5 | 266,095 |
| Woodville | 86,411 | 87.2 | 75,350 |
| Pahiatua | 157,462 | 94.0 | 148,014 |
| Akitio | 152,251 | 80.2 | 122,105 |
| Totals | 4,329,888 | 84.01 | 3,637,577 |
| **WEST COAST-WELLINGTON DISTRICT.** | | | |
| Clifton | 89,417 | 92.7 | 82,890 |
| Taranaki | 25,977 | 96.5 | 25,068 |
| Inglewood | 50,084 | 88.8 | 44,475 |
| Egmont | 18,881 | 96.8 | 18,277 |
| Stratford | 97,917 | 85.0 | 83,229 |
| Whangamomona | 49,428 | 86.2 | 42,607 |
| Eltham | 54,354 | 92.7 | 50,386 |
| Hawera | 78,954 | 95.3 | 75,243 |
| Waimate West | 5,083 | 104.3 | 5,302 |
| Patea | 208,169 | 97.6 | 203,173 |
| Waitotara | 135,206 | 86.8 | 117,359 |
| Waimarino | 178,036 | 85.1 | 151,509 |
| Wanganui | 267,482 | 82.9 | 221,743 |
| Rangitikei | 975,827 | 95.0 | 927,036 |
| Oroua | 211,512 | 97.6 | 206,436 |
| Kairanga | 121,811 | 95.6 | 116,451 |
| Kiwitea | 241,917 | 98.8 | 239,014 |
| Pohangina | 125,876 | 96.5 | 121,470 |
| Manawatu | 143,149 | 97.8 | 140,000 |
| Horowhenua | 124,340 | 99.4 | 123,594 |
| Hutt | 68,019 | 85.1 | 57,884 |
| Makara | 48,538 | 81.1 | 39,364 |
| Featherston | 327,719 | 94.6 | 310,022 |
| Wairarapa South | 166,839 | 87.8 | 146,485 |
| Masterton | 290,845 | 85 | 247,218 |
| Castlepoint | 93,715 | 82.3 | 77,127 |
| Eketahuna | 145,215 | 85.1 | 123,578 |
| Mauriceville | 46,445 | 77.2 | 35,856 |
| Totals | 4,390,755 | 91.85 | 4,032,796 |

# LAMBING ESTIMATES FOR 1946

| County. | Breeding Ewes (as at 1945). | Estimated Percentage of Lambs. | Estimated Number of Lambs. |
|---|---|---|---|
| **MARLBOROUGH-NELSON-WESTLAND DISTRICT.** | | | |
| Waimea .. .. | 169,365 | 84.0 | 142,267 |
| Takaka .. .. | 28,995 | 84.0 | 24,356 |
| Collingwood .. | 15,155 | 82.0 | 12,427 |
| Buller .. . | 1,872 | 93.7 | 1,754 |
| Inangahua .. .. | 14,631 | 93.3 | 13,651 |
| Murchison .. .. | 30,234 | 92.7 | 28,027 |
| Grey .. .. .. | 23,439 | 111.6 | 26,158 |
| Westland .. .. | 34,819 | 110.5 | 38,475 |
| Sounds .. .. | 97,437 | 67.8 | 66,062 |
| Marlborough .. | 197,225 | 84.8 | 167,247 |
| Awatere .. .. | 162,453 | 86.5 | 140,522 |
| Totals .. .. | 775,625 | 85.21 | 660,946 |
| **CANTERBURY-KAIKOURA DISTRICT.** | | | |
| Kaikoura .. .. | 134,971 | 84.1 | 113,511 |
| Amuri .. .. | 223,986 | 77 | 172,469 |
| Cheviot .. .. | 141,594 | 95 | 134,514 |
| Waipara .. .. | 279,595 | 98 | 274,003 |
| Ashley .. .. | 61,328 | 93 | 57,035 |
| Kowai .. .. | 70,517 | 96.5 | 68,049 |
| Oxford .. .. | 71,164 | 85.5 | 60,845 |
| Rangiora .. .. | 35,945 | 103.2 | 37,095 |
| Eyre .. .. .. | 51,348 | 101 | 51,861 |
| Tawera .. .. | 50,913 | 71.6 | 36,454 |
| Malvern .. .. | 124,746 | 94.4 | 117,760 |
| Paparua .. .. | 36,949 | 105.5 | 38,981 |
| Waimairi .. .. | 3,118 | 94.9 | 2,959 |
| Heathcote .. .. | 6,898 | 93.3 | 6,436 |
| Akaroa .. .. | 81,501 | 100 | 81,501 |
| Mt. Herbert .. | 40,670 | 98 | 39,857 |
| Waiwera .. .. | 71,295 | 102 | 72,721 |
| Halswell .. .. | 15,045 | 97 | 14,594 |
| Springs .. .. | 29,574 | 105 | 31,053 |
| Ellesmere .. .. | 75,291 | 94 | 70,774 |
| Selwyn .. .. | 146,498 | 78.2 | 114,561 |
| Ashburton .. .. | 701,127 | 94.7 | 663,967 |
| Geraldine .. .. | 224,050 | 94 | 210,607 |
| Levels .. .. | 153,500 | 101 | 155,035 |
| Mackenzie .. .. | 282,967 | 80 | 226,374 |
| Waimate .. .. | 435,223 | 80.5 | 350,355 |
| Chatham Islands .. | 40,818 | 73 | 29,797 |
| Totals .. .. | 3,590,631 | 90.04 | 3,233,168 |
| **OTAGO-SOUTHLAND DISTRICT.** | | | |
| Waitaki .. .. | 450,420 | 78 | 351,328 |
| Maniototo .. .. | 245,944 | 85.5 | 210,282 |
| Vincent .. .. | 258,950 | 83 | 214,929 |
| Waihemo .. .. | 100,294 | 79 | 79,232 |
| Waikouaiti .. .. | 70,508 | 94 | 66,278 |
| Taieri .. .. | 165,556 | 79 | 130,789 |
| Peninsula .. .. | 17,019 | 99.3 | 16,900 |
| Clutha .. .. | 407,836 | 102 | 415,993 |
| Tuapeka .. .. | 329,615 | 98.6 | 325,000 |
| Bruce .. .. | 21,731 | 101.7 | 215,330 |
| Lake .. .. .. | 126,686 | 74 | 93,748 |
| Southland .. .. | 1,664,058 | 103.5 | 1,722,300 |
| Wallace .. .. | 558,896 | 88 | 491,828 |
| Stewart Island .. | 2,078 | 80 | 1,662 |
| Totals .. .. | 4,609,591 | 94.06 | 4,335,599 |

### DISTRICT ESTIMATES.

The following table gives the estimates of the current (1946) season's lambing for each sheep district:—

| District. | Breeding Ewes (as at 1945). | Estimated Percentage of Lambs. | Estimated Number of Lambs. |
|---|---|---|---|
| Auckland .. .. | 3,169,368 | 87.82 | 2,783,346 |
| East Coast-Hawke's Bay .. .. | 4,329,888 | 84.01 | 3,637,577 |
| West Coast-Wellington .. .. | 4,390,755 | 91.85 | 4,032,796 |
| Marlborough-Nelson-Westland .. | 775,625 | 85.21 | 660,946 |
| Canterbury-Kaikoura | 3,590,631 | 90.04 | 3,233,168 |
| Otago-Southland .. | 4,609,591 | 94.06 | 4,335,599 |
| Dominion .. | 20,865,858 | 89.54 | 18,683,432 |

## Dominion Totals

The following table shows the estimated lambing for the North and South Islands for the previous five years, together with the actual number of lambs tailed:—

| Year. | Number of Breeding Ewes (*as at 1941). (†as at 1945). | Estimated Percentage of Lambs. | Estimated Number of Lambs. | Actual No. of Lambs Tailed. |
|---|---|---|---|---|
| **NORTH ISLAND.** | | | | |
| 1946 .. | †11,890,011 | 87.92 | 10,453,719 | — |
| 1945 .. | 11,890,011 | 92.56 | 11,004,903 | 11,252,679 |
| 1944 .. | 11,740,920 | 90.08 | 10,576,495 | 11,054,223 |
| 1943 .. | *11,268,384 | 87.18 | 9,823,748 | 10,654,244 |
| 1942 .. | *11,268,384 | 89.95 | 10,134,505 | 10,801,599 |
| 1941 .. | 11,268,384 | 90.74 | 10,224,786 | 10,568,215 |
| **SOUTH ISLAND.** | | | | |
| 1946 .. | †8,975,847 | 91.69 | 8,229,713 | — |
| 1945 .. | 8,975,847 | 92.75 | 8,324,990 | 8,308,779 |
| 1944 .. | 8,808,796 | 94.07 | 8,286,568 | 8,399,083 |
| 1943 .. | *8,762,549 | 89.16 | 7,813,548 | 7,767,692 |
| 1942 .. | *8,762,549 | 93.34 | 8,179,674 | 8,063,293 |
| 1941 .. | 8,762,549 | 91.60 | 8,026,076 | 7,955,075 |
| **DOMINION.** | | | | |
| 1946 .. | †20,865,858 | 89.54 | 18,683,432 | — |
| 1945 .. | 20,865,858 | 92.64 | 19,329,893 | 19,561,458 |
| 1944 .. | 20,549,716 | 91.79 | 18,863,063 | 19,453,306 |
| 1943 .. | *20,030,933 | 88.05 | 17,637,296 | 18,421,936 |
| 1942 .. | *20,030,933 | 91.43 | 18,314,179 | 18,864,892 |
| 1941 .. | 20,030,933 | 91.11 | 18,250,862 | 18,523,290 |

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# VETERINARY SERVICES COUNCIL APPOINTED

THE appointments of the 10 members of the Veterinary Services Council, set up under the Veterinary Services Act, 1946, to establish and maintain veterinary services to farmers on a national basis, have now been confirmed by the Governor-General, Sir Bernard Freyberg. They are:—

**Representing the Government:** W. C. Barry, M.R.C.V.S., Director of the Livestock Division, Department of Agriculture; J. F. Filmer, D.V.Sc., Director of the Animal Research Division, Department of Agriculture; E. L. Greensmith, M.Com., Assistant Secretary of the Treasury Department.

**Representing the Dominion Federation of Farmers' Veterinary Services:** A. Leslie, M.R.C.V.S., veterinary surgeon, Eltham; R. T. Scott, Matumaoho, Morrinsville.

**Representing the New Zealand Dairy Board:** A. Linton, Greytown; W. G. Macartney, Tai Tapu.

**Representing the New Zealand Meat Producers' Board:** G. H. Grigg, Hororata.

**Representing the New Zealand Wool Board:** W. Horrobin, Waikanae.

**Representing the New Zealand Veterinary Association:** G. MacDonald, M.R.C.V.S., veterinary surgeon, Cambridge.

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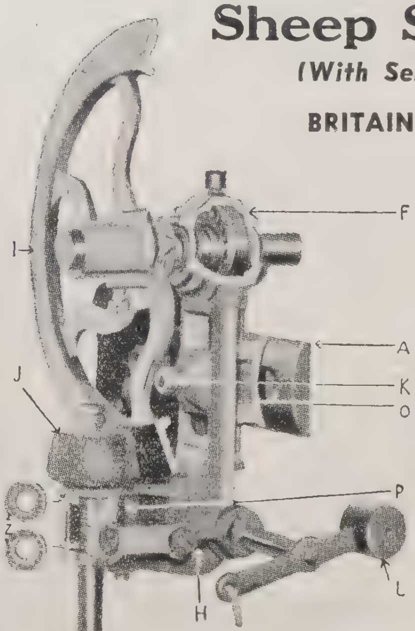
## Sheep Shearing Machinery

*(With Self-Aligning Ball Bearings)*



WOLSELEY Ball-Bearing

**Brackets** provide A.K.O. for quick and exact adjustment in any direction on arcs of circles for earthquake displacement.

**"P" Friction Arm** working on arc of circle avoids old straight in and out bumping contact. Fitted with long life **"J" Rubber** Friction Cone mounted above and out of the way of grease cups—correct load distribution.

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Although manufacturer's deliveries are uncertain and are likely to be so for some time to come, we can still supply complete Plants—both Shafting and Electric.

You will be well advised to place your order NOW, even if you do not want immediate delivery—we can then reserve your requirements for delivery when required.

World's Record Breaking No. 10 Handpieces, Combs and Cutters sent out with all complete Plants.

Will owners of Wolseley Plants place their orders **immediately** for Shearing Season's requirements, otherwise we cannot guarantee delivery.

*Send for descriptive leaflets "Z," "L" and "N."*

**CHEAPEST TO INSTALL. CHEAPEST TO RUN. MOST EFFICIENT.**

**Wolseley Electric Plant with Wolseley Capacitor Type "Wonder" Motor.**—Fit anywhere at any height.

No belting or friction Cones—saves friction, wear and power.

Starts and stops instantaneously by turning the switch.

No motor lubrication required for ten years.

No carbon brushes to wear.

Cheapest to wire and easily portable.

Charge for current normally under 3d. full working day.

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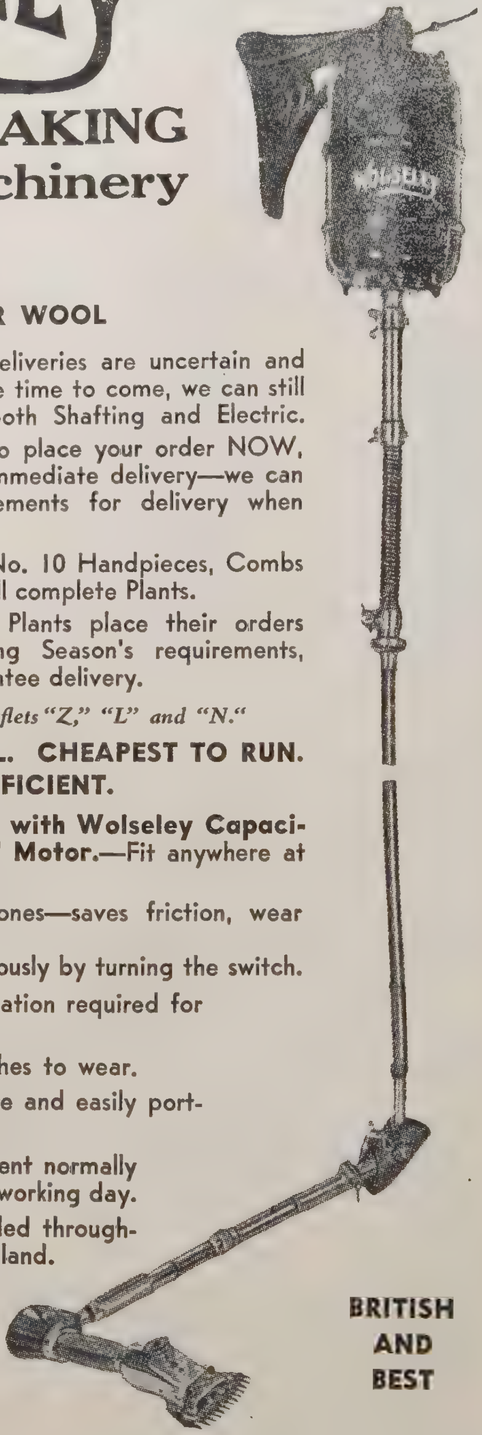

The business end of the shearing plant—the WOLSELEY HANDPIECE, which has made every World's Record Machine Shearing tally. At present this can be supplied only with Wolseley plants. Daily tallies made—433, 417, 412, 409, 406, 383, 374, 373, etc.

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# THE HOME GARDEN IN MARCH

*"Whatever we have in any sort begun wisely it is good to finish it thoroughly."*—John Ruskin.

**MANY garden vegetable crops will reach maturity during March, and others during favourable autumn weather will be storing up plant energy necessary for them to survive inclement winter weather successfully. Home gardeners should therefore consider the literal interpretation of the above quotation by not neglecting any opportunity of doing everything possible to "finish thoroughly" the work in the vegetable garden which was "begun wisely."**

*By* **D. K. PRITCHARD,** *Instructor in Vegetable Culture, Wellington.*

FROM March till the time when work in the garden will be less strenuous and exacting activities should be directed to the protection of maturing crops until harvesting is completed, and toward encouraging growth and development of crops from which winter and early spring supplies are expected.

## Onions

The onion crop is the first among crops which should mature during March. To produce long-keeping bulbs—and these should be considered of major economic importance for domestic use—dry weather conditions are necessary during the latter period of development. Everything possible should be done to prevent prolonging vegetative growth of the plants. If bulbs are well developed, no water should be applied during February and hoeing for weed destruction should be stopped during the same period.

Bulbs can be considered ready for harvesting as soon as the tops turn brown and begin to change from their usually erect position. If possible, a warm, dry, sunny day, when a good wind is blowing, should be chosen for pulling the onions. If the soil is dry at the time of harvesting, so much the better. Laid in double rows with the bulbs facing each other, they will soon dry, but if wet weather is expected, removal to a dry, airy shed or other covering will be necessary.

## Potatoes

As long as top growth of potatoes remains healthy and vigorous tuber development will continue and the ultimate weight of the crop will increase. Where it is practicable, and under the conditions just mentioned, the main potato crop should be permitted to mature in the normal way before digging. Haulm which has become diseased should be removed and burned before the crop is dug.

There is nothing to be gained by leaving a matured pototo crop undug, as, where the rows have been insufficiently moulded, the tubers are liable to attack by the potato tuber moth, and if the soil becomes too wet, the tubers may start to grow, which will seriously impair their keeping quality.

The adoption of these recommendations may assist in preventing the loss of a valuable potato crop and in the securing of the heaviest possible yield.

## Beans and Peas

Not much can be done to "hold" bean and pea crops for use at any desired time, as they are best used when tender. Climatically, however, there is a vast difference in their requirement. All varieties of beans are warm-weather, frost-tender vegetables, while peas are not only a cool-weather variety, but will stand considerable frost without damage. It is desirable, therefore, when sowing seeds for autumn crops, to space the dates so that peas will be maturing after cold conditions make further harvesting of beans impossible.

It is authoritatively stated that high quality of peas is closely related to the ratio of their sugar-starch content, and that during maturity there is a quick decrease in sugar and other soluble matter with relative increase in starch. This change, it is stated, decreases the nutritional value of over-mature peas.

## Tomatoes

Since notes on tomatoes appeared in the February issue of the "Journal," information available indicates further deterioration in the prospects of a plentiful supply of tomatoes being available from the crops of commercial growers, and again it appears necessary to stress the importance of doing everything possible to prolong the productive life of the vines so that the best possible yield may be obtained from plants growing in the garden.

Where high winds prevail satisfactory crops cannot be secured from tomato plants unless adequate shelter is provided.

Attacks on tomato plants and fruits by some injurious fungi may be greatly minimised or entirely prevented by the careful adoption of appropriate cultural practices, and the amount of disease-free fruits secured will almost certainly be increased.

**Botrytis Stem Rot.**—The danger of attacks by botrytis species will be less if care is exercised when tomato plants are being pruned or when leaves are removed. A sharp knife should always be used, a clean cut made, and the leaf or shoot cut close to the stem. As conditions conducive to high humidity are primarily responsible for the occurrence of this disease, removal of all leaves **under** the first truss of fruit **before** it is picked will provide for a better circulation of air around the base of the plant. Shallow cultivation of the

[*Sparrow Industrial Pictures Ltd.*

**Keep soil away from bulbs of onions, but be careful not to expose the roots.**

soil around and near the plants will assist in their protection from botrytis and other injurious fungi.

**Manuring.**—The use of unbalanced fertilisers for tomato plants is a common source of trouble. Excessive manuring at planting time and subsequent starvation are often responsible for such disorganisation of plant tissues that resistance to disease is weakened. The reverse practice will have similar disastrous results. To maintain tomato plants in healthy condition fertilisers should be applied with discretion throughout the plants' growth. This applies especially to the use of excess nitrogen.

**Caterpillars.**—Unless action is taken against caterpillars, they may cause losses of fruit out of all proportion in value to the cost of treatment, which, when properly applied, will exterminate them. Powdered arsenate of lead, ½oz. to each gallon of Bordeaux mixture, is specially recommended.

### Kumaras

During March main attention to kumaras should be directed toward preventing the vines rooting at the nodes. Provided growth is not too abundant, this may be done by occasionally raising them by hand or with the handle of a hoe. Although the tubers are quite good to eat when they have reached consumable size, digging before they are fully matured will often substantially reduce the yield. If, as sometimes happens, the foliage is attacked by some leaf-eating insect, Bordeaux mixture with the addition of arsenate of lead as recommended for the control of caterpillars on tomatoes will usually prove effective. If nicotine sulphate is preferred to arsenate of lead, the spray should be applied during the warmest part of the day.

### Carrots (Spring)

With allowance for climatic differences, seed for the production of early spring carrots is generally sown in March. To ensure good seed germination the soil should be worked down to a fine tilth and the bed made in a well-drained position. It is a waste of time and effort to attempt to produce early spring carrots on badly-drained soil. Where drainage is not considered satisfactory a raised bed will be necessary, and for convenience the bed should not be more than 3ft. wide.

In preparing land for this crop no stable manure or green manure should be dug in immediately before sowing the seed.

If 2oz. of superphosphate a square yard is broadcast and worked into a suitable part of the garden just cleared of a cabbage or potato crop which had been well manured, a bed fertile enough to produce a good crop of carrots should result. If additional fertiliser is required, blood and bone manure applied in equal quantity will give good results.

When the bed is ready for sowing the shallow furrows into which the seed is to be sown should be made **across** the bed and **not lengthwise.** If this method is adopted, weeding and thinning can be done without treading on the soil among the young plants. This is important, particularly on soils of heavy texture, as treading on such soils during winter will set them down hard, which is inimical to best production.

Carrot seed sown during March should require only light soil covering. During dry weather the surface of the bed must be kept moist.

In shallow, heavy soils a short, stump-rooted variety such as Early Horn will be suitable, but in suitable friable loams good results may be obtained with seeds of Chantenay, Earlykrop, or Champion Scarlet Horn.

### Lettuce

Lettuce plants from seed sown during late January or early February should be set out as soon as convenient so that they may be fairly well grown before really cold weather begins. Although lettuce is a cool-weather plant, good crops cannot be grown during frosty, cold, or inclement conditions.

As with spring carrots, the best possible drainage is necessary as well as fertile soil. The seedlings, although they will not develop into full-sized lettuces, should not be set closer than the usual distance; 12in. between the plants each way will not be too much space to allow for cultivation during winter. Varieties specially recommended for this planting are Imperial 615 and Neapolitan-Winter Market.

### Rhubarb

Although spring- and early summer-bearing rhubarb will now be dormant and non-producing, it is a mistake to assume that the area occupied by the roots can be neglected and allowed to become a bed of weeds. Such undesirable growth extracts from the soil valuable plant food which should be stored by the rhubarb roots to produce next season's crop.

If the bed has not been properly attended to since pulling stopped, this should be done without delay. A heavy dressing of blood and bone manure, 2 or 3 handfuls to each root, and well worked into the soil, will be beneficial. If available, a substantial mulch of well-rotted farmyard manure spread over the bed will greatly assist in maintaining the fertility of the soil and its humus content, which are necessary for the production of heavy rhubarb crops.

Winter- and ever-bearing varieties should be kept free of weeds and heavily fertilised, and seed stalks should be cut as soon as they are observed, as they drain the roots of stored fertility if permitted to develop.

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## Asparagus

No top growth whatever should be removed from asparagus roots. Advice sometimes given that the fern production should be removed before it has ripened is contrary to the best practices generally adopted. As the dense overhead growth usually smothers all weeds, no great amount of attention is necessary. This does not mean, however, that when weeds do appear they should not be destroyed; only fern growth from the roots should be permitted to grow on the asparagus bed.

## Cauliflower

Developing cauliflowers should now receive every attention so that the curds may be harvested before frost damages them or makes them unfit for consumption. More good cauliflowers are lost through being checked during growth than from any other cause; they are exacting plants and lack of proper attention will ruin many a promising bed. When plants appear to be "hanging fire" liquid manure, either organic or inorganic, should be applied.

As soon as curd growth becomes prominent and the inside protecting leaves are inclined to turn outward, the large, erect outside leaves may be loosely tied together at the top to protect the heads from direct sunlight and preserve their natural whiteness.

## Broccoli

Much the same recommendations may be made for broccoli as for cauliflowers. Broccoli are much hardier than cauliflowers and will stand up to weather conditions which would make cauliflowers unfit for use. Growth of broccoli should not be checked for lack of fertiliser, however, and liquid nitrogenous manure will greatly assist the plants' development during late autumn and winter.

[*Photo News Ltd.*

**In exposed gardens even Brussels sprouts need a good stout stake.**

### THE POTATO TUBER MOTH.

The potato tuber moth is sometimes responsible for considerable damage to growing potatoes, but its effects are worst on stored tubers.

The moth flies at night and generally lays its eggs on leaves of plants. Eggs may be laid directly on the exposed parts of seed or growing tubers insufficiently covered with soil, the larvae subsequently burrowing into the potato.

Crops intended for storage should never be left out uncovered overnight, but it is not advisable to use the haulms to protect the tubers. All top growth is best destroyed by burning. Dusting potatoes in store with slaked lime is said to give some protection against the moth.

[Reference: "Garden Pests in New Zealand"—David Miller.]

[*Sparrow Industrial Pictures Ltd.*

**There is nothing to be gained by leaving a matured potato crop undug. If rows have been insufficiently moulded, the tubers are liable to attack by the potato tuber moth.**

### PLANT HORMONES.

Among the substances for sale at present under the name of hormones are some sold as weedkillers. A certain amount of effective weed control has been achieved by their use, but gardeners should be warned of damage which may be done to other plants by the use of apparatus which, after being used for weed destruction by one of these hormones, is not sufficiently cleaned of all traces of the liquid mixture before being used for the application of other substances.

**Tests recently carried out at the Plant Research Bureau, Department of Scientific and Industrial Research, on the residual effects of one of these weed-killing hormones showed that tomato plants may be damaged at a concentration of 1 in 4,000,000. Although greater dilutions were not tested, it is possible that damage may be done to plants at an even lower concentration. It is important, therefore, that every part of spraying apparatus used for weed-killing should be thoroughly cleaned before being used to spray garden plants to protect them against disease or insect damage.**

### GREEN MANURING.

The use of weeds and crops in a more or less matured condition to maintain the organic matter content

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Protect the eyes of youth with Laurel's "soft, white light." Laurel Kerosene burns steadily and brightly to the last drop, because it contains no impurities to clog the wick. There is no smoke nor any disagreeable odour. For efficiency and economy —Insist upon LAUREL KEROSENE.

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THE PERFECT ALL-PURPOSE KEROSENE

*For Lighting, Heating, Cooking, Cleaning*

[*Photo News Ltd.*

**A crop of oats, peas, and lupins sown as the potatoes are lifted will provide a luxuriant growth of foliage to dig in to keep up the soil's fertility. The cover crop may be sown in rows or broadcast.**

of soil in which edible crops are grown is probably as old as agriculture. It is known to have been practised in China as early as 1134 B.C., and is carried on extensively in that country at present.

The value of digging and ploughing in green manure crops is recognised in all civilised countries, particularly where intensive cultivation is carried on. Under continuous cropping and without constant replenishment of organic matter soil would quickly lose its fertile quality and become useless for crop production.

The importance of organic matter to the fertility of soil, on which it has both a physical and biochemical action, cannot be over-estimated. Its improvement of the physical structure of the soil makes good tilth production easier, stimulates aeration, and increases its moisture-holding capacity.

Although organic matter is sometimes referred to as humus, to which it ultimately becomes transformed, the term humus is incorrect when applied to an organic substance. Many soil scientists agree that humus, which is the product of decayed organic matter, is a complex and little-understood substance.

Before motor-powered vehicles became widely used on and off the farm stable manure was the principal organic matter used for vegetable crop production. The present scarcity of stable manure has made necessary the growing and ploughing in or digging in of crops grown specially to maintain soil fertility.

Unfortunately for the home gardener it is not practicable to grow for green manure crops which are stated to give best results, but from others which may be grown good results can be secured.

**Legumes.**—Plants of this species possess the special faculty of storing in their roots nitrogen which they extract from the air. Of these plants the seed most commonly used is that of lupins. Seed of any of the pea and bean varieties will serve the same purpose of providing nitrogen, which, when the crop has been dug into the soil and is decomposed, will be available for the succeeding crop.

**Non-legumes.**—Commercial vegetable growers usually grow oats as a green manure crop, but barley, maize, millet, and mustard are other plants which improve the soil when they are dug in.

The time when a green manure crop should be turned under is determined mainly by the kind of vegetable crop it is intended to plant on the area occupied.

### APHIS AND CARROT RUST.

Correspondence received from home gardeners who find it difficult to grow good carrots often reveals a mistaken idea of the respective damage done to carrots by aphis and carrot rust fly.

**Aphis.**—When carrot seed is sown during midsummer or while the weather is warm and dry bad germination is often blamed for crop failures when aphis, which during warm, dry weather will destroy a bed of young carrots almost as soon as the first leaves appear above ground, are the real cause.

Aphis are most active during midsummer, but **their depredations are confined to the leaves** from which they suck the plant sap, causing the growth to become stunted, curl, and turn yellow. If no remedial treatment is given, affected plants may be killed.

Paranaph, nicotine sulphate, or derris dust applied regularly will keep the pest in check and prevent it from becoming a menace to the plants.

(**Leaf Blight.**—Yellowing of carrot leaves may also be due to leaf blight caused by the fungi *Macrosporium* or *Cercospora*, which may be controlled by spraying with Bordeaux mixture 4-4-50 at weekly intervals. A thorough examination of the plants will readily determine what is responsible for the carrot foliage turning yellow.)

**Carrot Rust Fly.**—In the North Island, and especially in the Auckland Province, the carrot rust fly is seriously affecting profitable carrot production by commercial vegetable growers, and home gardeners are similarly affected.

As with aphis, dry weather conditions favour the activities of this pest, damage from which is confined to the roots.

The larvae are stated to be slender, straw-coloured maggots 3-10in. long, which generally eat their way from the crown of the root down the side to the tap root, but the secondary roots may be destroyed first. Leaves of attacked plants turn a **reddish-purple**, which is entirely different from the readily visible indications of the presence of aphis.

Of the many insecticides which have been experimented with to control this pest, naphthalene has been outstandingly successful, and weekly applications of horticultural naphthalene at the rate of 1oz. along 9ft. of row are recommended. In badly-infested areas it may be advisable to increase this amount by one-third.

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# Plant Growing on the Farm

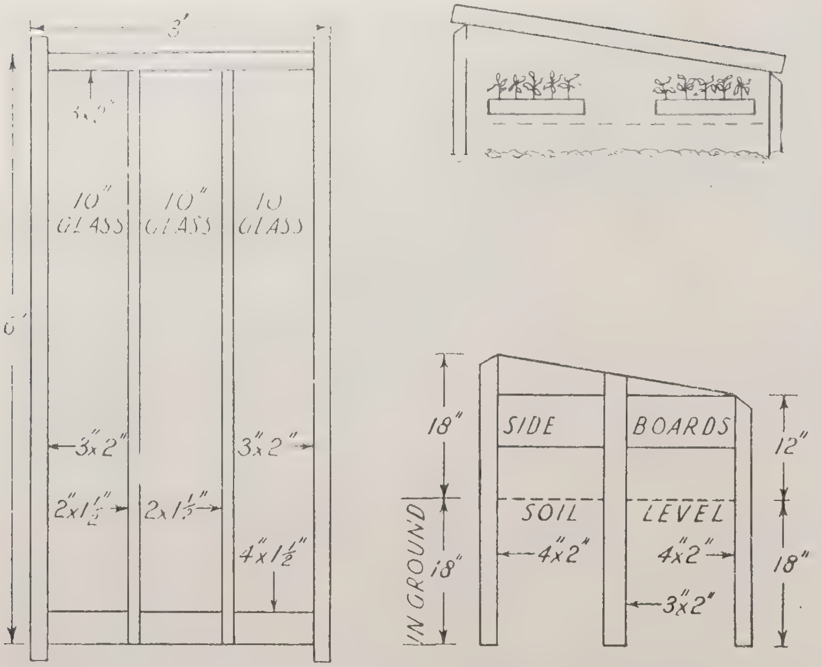
"Hullo," said the farmer when an officer of the Horticulture Division surprised him while working in his garden. "So you're the Instructor in Vegetable Culture who writes about vegetables in the 'Journal of Agriculture.'

"You know, I was intensely interested in what you wrote in the January issue of the 'Journal' about a glasshouse on the farm. I've no doubt it's a good idea, but I was down in a market-gardening district a week or so ago and I called on one of the gardeners there and had a good look round. He was a good fellow, but some of them won't tell you much—you know, pretty close.

"However, I saw a structure that took my fancy, made a mental note of it, and have since been working out the details of my ideas. Interesting, yes, but you'll find it more so when I give you all the details of what I have figured out.

"The method this market gardener had of growing early and other plants was a sort of box. A frame, yes, that's the name he gave it. On top of it was what appeared to be a window resting on two pieces of timber—runners, is that the name given to them, and the window affair is called a light?

"The narrow ends of the frame faced north and south, and the south end was higher than the other. That, I thought, would allow for more sun-



Diagrams of a frame 6ft. x 3ft. which will accommodate 5000 seedlings pricked out ½in. apart in rows 1in. apart or 2500 seedlings at 1in. apart.

light and provide a quick run-off for rain. The light, as you said the glassed part was called, could be moved backward or forward. Yes, you're right, by this means ventilation would be provided for plants growing in the frame.

"I'm pretty handy with the few carpenter's tools I've got, and I'm quite sure between the wife and me we'll make something suitable for growing early vegetable plants. Of course, I've got what you wrote about a small glasshouse at the back of my head, and I have no doubt that when we see what can be done with this small affair—a frame, two runners, and a light, yes, I've got it all right—we will not be satisfied until we realise our ambition.

"Between you and me this vegetable business in early spring has got me worried." (This in a distinctly lower tone, as the kitchen window was wide open.)

"I've been working out the details of the number of plants that could be grown in one of these frames. Six feet long by three feet wide, so that's the exact size? I'm glad I've got that right. I didn't want to appear inquisitive, you know, though I was interested. I'll write the size down so I won't forget.

"I intend to start with a seedling box like those you have sometimes referred to in your 'Journal' notes, which might be the same size as an apple case, 19½in. by 12in., but only 2½in. to 3in. deep. If the bottom of this box is close boarded, leaving just enough space for surplus water to drain away, I could get quite a lot of seedlings, enough to fill up this frame if I pricked them out into it.

"You don't think so? You think I would require more than one box of seedlings to fill up the frame? Well, let us see how it works out. Yes, I know that plants like cabbage and lettuce can be pricked out pretty close. Half an inch would be quite enough, you think? Well, you ought to know.

"So, at half an inch apart in rows one inch apart this frame 6ft. by 3ft. would hold over 5000 plants, and pricked out one inch apart the frame would accommodate more than 2500 plants. Well, that is a surprise.

"Now, how would that work out for growing tomato plants? We use a lot of tomatoes, and I was thinking of growing my own next season. Yes, I've got a copy of your book 'Vegetable Growing in the Home Garden.' I'll look it up about tomatoes.

"Let me see, this frame would hold three boxes in the lengthwise run and three across; that would be nine boxes. Overcrowded when the plants begin to grow, you think? I suppose that's what would happen. Well, if I only pricked out six boxes of seedlings and each box contained 36 plants, that would be 18 dozen tomato plants I could grow comfortably in this frame 6ft. long by 3ft. wide. It's amazing.

"Well, if this can be done in one frame and one light, I—I mean we—will be more determined than ever to put up that small glasshouse. It's just beginning to dawn on me the possibilities for plant growing of the small structure you wrote about.

"By the way, if you happen to have a little plan of the frame I've been telling you about, I'd be glad to have a copy. Of course, I'm a bit of an amateur at the plant-growing business, and if I should get into difficulties and require assistance—yes, I remember seeing it in your book—so if I write to the Director, Horticulture Division, Department of Agriculture, P.O. Box 3004, Wellington, telling him about my troubles, I'll get a reply with some good practical advice? Well, that's what I call real service from your Department.

## A Children's Garden on the Farm

Could anything be more influential in fostering and developing a rudimentary knowledge and love of soil cultivation than the allocation of a small area of the garden where children could produce flowers and vegetables under their mother's supervision.

Throughout their education children are constantly being reminded of the vitamin value of vegetables when these are freshly taken from the garden and used without delay.

Records have been published of the success of some scholars in the production of field crops. The inauguration of some competitive stimulus for home garden vegetable growing is surely not impossible.

"You know, I've enjoyed this talk and I hope you've got some ideas it may be possible to pass on to someone else. I believe in mutual assistance, and you fellows travelling about have a good opportunity of passing on points you may pick up from men like myself.

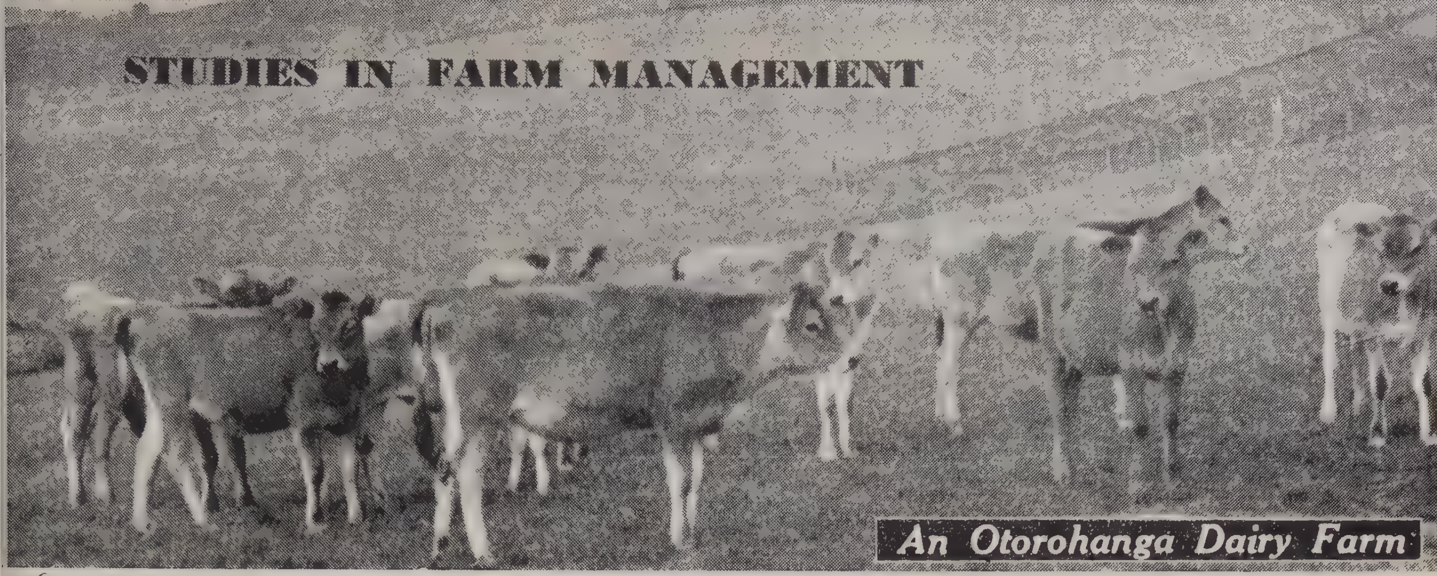
"What! You're not going away like that, surely; I just heard the cups rattling on the kitchen table."

◆

### SPIN YOUR OWN WOOL.

**All stages of the processes of home spinning, from selection of wool to skeining and dyeing, are described in detail in a new bulletin "Spin Your Own Wool." This bulletin, No. 259, also contains a valuable chart for the use of vegetable dyes and mordants. Write or call at the nearest office of the Department of Agriculture for this and other informative bulletins.**

# STUDIES IN FARM MANAGEMENT



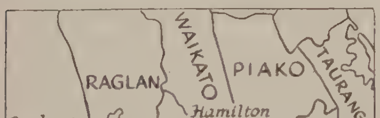
An Otorohanga Dairy Farm

**FEW districts in New Zealand have made such progress within the past 20 years as Otorohanga County. During that period the number of dairy cattle has doubled, total cattle have also doubled, and the number of sheep has risen from 20,000 to 200,000. There are considerable areas of easy country still awaiting development or improvement, and in the next 20 years there should be a further substantial increase in stock.**

### By K. M. MONTGOMERY, *Fields Instructor, Te Kuiti.*

THE Otorohanga County lies in the south-western corner of the Waikato Basin and is bounded by Waipa, Matamata, Taupo, Waitomo, and Kawhia Counties. It has an area of 384,000 acres, of which 196,000 acres are occupied. It can be divided into three main areas: The pumice country of the eastern hills, the rolling to steep hills of the west, and the flat to easy rolling country of the central area. There is also a small area of drained swamp around Te Kawa.

The county is well watered by the Waipa River and its tributaries. Excellent trout fishing may be had in the upper reaches of the Waipa and many of the streams flowing into it. The Main Trunk Railway runs across the centre of the county in a north-easterly direction, and good roads radiate from the three stations, Te Kawa, Kio Kio, and Otorohanga.



The only township, Otorohanga, is the headquarters of the county administration. It is the centre for the stock and station agents, and the saleyards are close to the town. At the Otorohanga Agricultural and Pastoral Show some of the Dominion's best stock is exhibited.

The only dairy factory, which makes about 3400 tons of butter a year, draws its supply of cream from portions of Otorohanga, Waitomo, and Kawhia Counties. However, much of the milk and cream produced in the county is processed in the two factories in Te Awamutu, about five miles over the northern boundary. A limeworks has recently been opened about six miles from the railway and has a yearly output of about 10,000 tons, and another works is being constructed beside the railway. Timber milling is another important primary industry and mills operate at Arohena and Ngaroma in the eastern hills and close to Otorohanga.

Twenty years ago Otorohanga County, with 16,320 dairy cows and only 20,600 sheep, was predominantly a dairying district. In the next 10 years dairy cows increased to 32,700 and sheep to 85,200, and in the past 10 years the dairy cow figures have remained the same and sheep have increased to 200,000. In the same period run cattle have also increased from about 9000 to 17,000. Comparatively few run cattle are bred in the county; they are usually bought in from the neighbouring counties of Waitomo and Kawhia. Sheep farmers have realised that to keep their pastures fit for grazing sheep it is necessary to run some cattle with the sheep. Most of the cattle are sold as forward stores or fats, and from the topdressed central area almost exclusively as fats.

**The change in types of farming is mainly attributable first to the invasion by ragwort of country not eminently suited to dairying, which compelled the farmer to turn to sheep to keep his pastures clean; and secondly to the improvement of pastures by the use of Certified seeds and topdressing, so that the fat lamb trade offered almost as good a reward with less labour than is necessary for dairying. Sheep were once relatively unimportant in the county, but sheep farming has now attained at least half the importance of dairying in the district.**

## Climate

The climate of the county is well suited to the types of farming engaged in. The rainfall of about 36in. is reasonably distributed throughout the year, though there are years when a dry period during late summer and autumn reduces the pasturage to a low level of production. Frosts are not of great intensity and occur for only about 3 months, though there is always the danger of a late frost damaging home gardens and orchards. Occasionally snow falls on the tops of the ranges, but it does not lie for more than a day or two.

## Soil Types

There are three main soil types with slight variations within these types:—

First, the brown loam which covers the greater part of the county: This soil is free working and does not pug up in wet weather. It is very responsive to phosphatic dressings and lime is also beneficial.

Second, the podzolised soils of the eastern hills: These are pumiceous and when cultivated work down to a very fine powder. Consolidation of these soils is most important for the production of good crops and pastures. They are even more responsive to phosphatic fertilisers than the brown loams.

Third, the meadow soils, which are confined to the flats: They will carry a first-class pasture of ryegrass and white clover, but are very liable to pug up during wet weather. An area of peaty swamp at Te Kawa is being steadily developed and the summer carrying capacity is good.

## Pasture Establishment

Permanent pasture is usually sown after a root crop; grass is seldom sown after grass. Ample consolidation of the seed-bed is essential for pasture establishment, especially on the first two soil types mentioned.

In parts of the county where the rainfall is spread over the whole year spring sowing is favoured, and an early spring-sown pasture will provide good grazing during the summer. When grass is sown in spring after roots the land is double disced and harrowed and, if a roller is available, rolled before and after sowing the seed and fertiliser. In the early stages of development many spring-sown pastures show the effect of insufficient consolidation, the white clover in particular failing to make satisfactory growth before the dry weather sets in.

In the central area, where the hot weather is more likely to dry out a pasture, autumn sowing is preferred. Sometimes the land is allowed to lie fallow during the summer, but it should be kept stirred with harrows to keep it clean or it will require reploughing, causing loss of consolidation.

The ultimate aim on most of the country is a perennial ryegrass-white clover-cocksfoot association with species such as crested dogstail, red clover, and timothy taking a secondary place in the sward. Special-purpose swards, such as prairie grass, have been established on a few farms with good results. On the hill country subterranean clover and *Lotus major* combine well with the lower-fertility grass species such as danthonia, browntop, *Poa pratensis*, and crested dogstail.

It is not possible to give a pasture mixture for arable land to suit every farm in the county, but the following mixtures can be modified to suit local conditions:—

| | For dairy cows and hay (lb. an acre) | For sheep and run cattle (lb. an acre) |
|---|---|---|
| Certified perennial ryegrass | 20 | 22 |
| Certified cocksfoot .. .. | 10 | 5 |
| Crested dogstail .. .. | 2 | 4 |
| N.Z. broad red clover .. | 3 | 2 |
| Certified white clover .. | 3 | 2 |
| Totals | 38 | 35 |

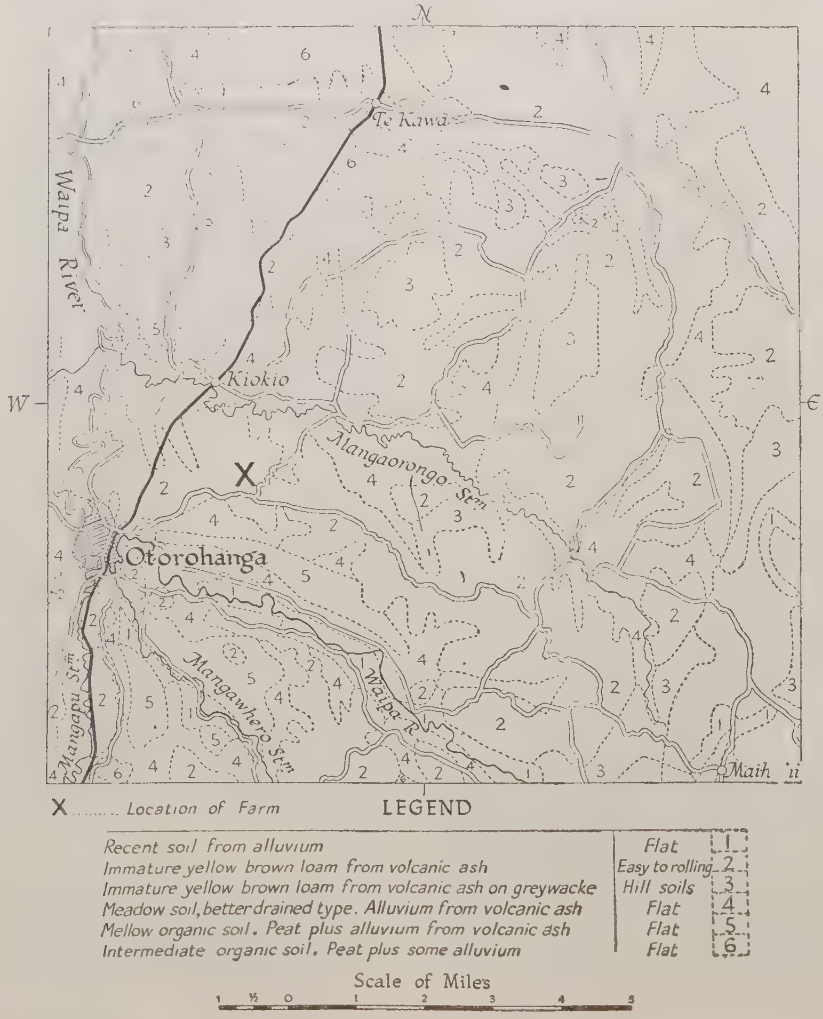
If the seed is to be sown in the autumn, the perennial ryegrass can be reduced by 5lb. and replaced by either Certified Italian ryegrass or, better still, up to 10lb. of H1 ryegrass. If the land is inclined to be damp, 3 or 4lb. of timothy can be added to the mixture for dairying land. If subterranean clover is desired in the sheep grazing mixture, 1 or 2lb. can be added in the autumn sowing.

Perennial ryegrass needs no comment; it is the dominant species in practically all pastures. The inclusion of H1 ryegrass should be given a trial, as it gives promise of replacing Italian ryegrass; except in the autumn it has a greater production than perennial ryegrass, and it is longer lived than Italian ryegrass. Of late years, because of its high price, the proportion of cocksfoot has been considerably reduced, but older-established pastures which were sown with 10 to 12lb. an acre of cocksfoot are much more productive, especially when the field is lightly grazed or closed for silage or hay.

Not enough attention is paid to crested dogstail on the second- and third-class pasture lands. As this grass is eminently suited to a lower fertility than that demanded by perennial ryegrass, the inclusion of 4lb. an acre is warranted. Timothy does very well in the district, especially in the damper situations. It is very palatable to stock and when grazed it is very hard to detect in the pasture, but under haying conditions its presence is easily detected.

Montgomery red clover has not been a success in the county; establishment is often poor and at the end of a few years it has almost disappeared from the sward. However, broad red clover can be relied on to produce a good bulk of herbage for at least 3 years under a dairy cow grazing-haying system of pasture management. White clover is found in practically all pastures and for general purposes it has no equal.

Harrowing of pastures in the spring with a heavy set of tripods and chains to spread the accummulation of drop-


N
W
E
Te Kawa
Waipa River
Kiokio
Mangaorongo Stm
Otorohanga
Mangawhero Stm
Waipa R.
Maih ii
X ........ Location of Farm
LEGEND
Recent soil from alluvium — Flat — 1
Immature yellow brown loam from volcanic ash — Easy to rolling — 2
Immature yellow brown loam from volcanic ash on greywacke — Hill soils — 3
Meadow soil, better drained type. Alluvium from volcanic ash — Flat — 4
Mellow organic soil. Peat plus alluvium from volcanic ash — Flat — 5
Intermediate organic soil. Peat plus some alluvium — Flat — 6
Scale of Miles
1 ½ 0 1 2 3 4 5

pings on fields where the cattle have been fed supplementary fodder during the winter is common, but could be carried out more frequently on many farms with great advantage. Too many fields, when closed for silage or hay, are decidedly blotchy in appearance from the strong growth around unspread droppings.

The oversowing of indifferent pastures with perennial ryegrass and white clover has improved many of these pastures and obviated the necessity of ploughing and regrassing. The field is grazed hard in March, disced or harrowed to produce a cover for the seed, and oversown with 10lb. of perennial ryegrass and 1 or 2lb. of white clover with the fertiliser. This method of pasture improvement could be much more widely practised.

**The saving of winter grass is not a strong feature of the grassland management in the county. Too many farmers allow their stock access to the whole farm during the winter, and in the late winter and early spring there is not a fresh bite for the newly-calved cows.**

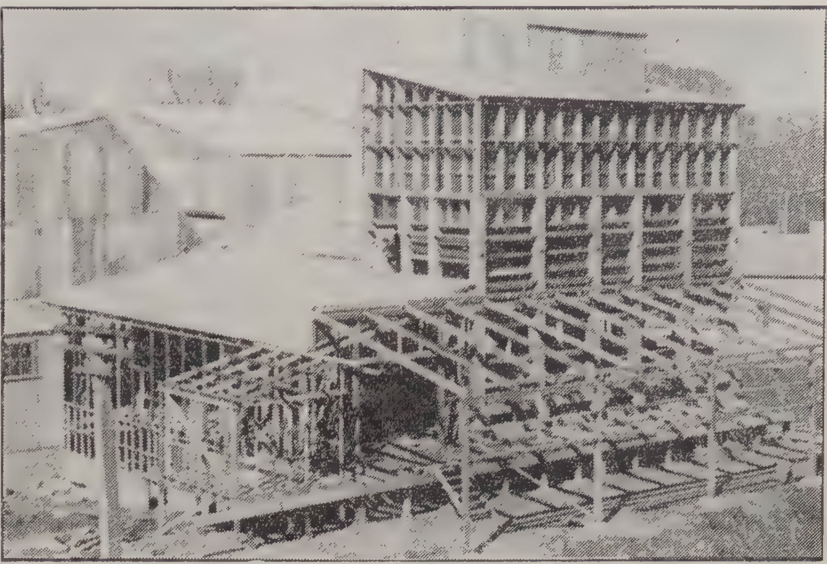
To obtain winter grass it is necessary to shut up the field during April so that the ryegrass will be growing well before the winter sets in. If the winter is mild and the pasture is making good growth, a light grazing when the pasture has attained a height of about 9in. will not materially affect its late winter-early spring production.

The greatest problem facing the farmer is dealing with the luxurious growth in the spring and early summer. On dairy farms which are well subdivided this problem is easily dealt with; as the growth reaches a stage where it cannot be controlled by the cows, fields are withdrawn from the grazing rotation and closed for silage or hay. On the larger farms where subdivision is not so intense additional stock are bought in during the spring and summer to be fattened.

## Silage and Hay

Surplus pasturage is conserved as hay on most farms, and about 10,000 acres are harvested annually. However, much of the hay saved is of poor quality, chiefly because the quality of the pasture cut is poor, or because too large an area is cut at one time and bleached by the sun or spoilt by rain before the material is stacked. Failure to cover the stack adequately is also responsible for much wastage of hay. Of recent years baling direct from the windrow with a pick-up baler has become popular. This method of collecting the hay has much to commend it, but it depends on good weather.

**Silage making has not retained its popularity of some 10 years ago, and this method of conserving surplus pasturage should be more widely practised than at present. Pastures which have been cut early usually make sufficient recovery to give good grazing during the summer, whereas hayed pastures often fail to produce much growth until the autumn rains fall.**



Limeworks under construction in Otorohanga County.

Not only do the pastures have a better opportunity to recover, but ensiling can be undertaken when the weather prevents haymaking. Permanent pasture sowings of the previous autumn, especially those containing Italian or H1 ryegrass, can be cut for silage while the growth is still luscious without harming the pasture if a good establishment of clover has been secured. The farmer would find it beneficial to feed a ration of silage to his dairy cows and ewes for a month before calving or lambing rather than to depend entirely on hay, much of which is of doubtful quality.

## Cropping

Most pastures on the ploughable country have been laid down after a root crop, and that method is still followed. Cropping is confined chiefly to swedes and chou moellier for winter feeding, and only small areas of soft turnips are grown for summer feeding to dairy cows. Soft turnips are sown in October-November for January-February feeding to the dairy herd, the land then being sown to permanent grass in the autumn. The main crops of swedes and chou moellier for winter feeding are sown in November-December and the land then sown to grass in the spring if it is not required for soft turnips.

Very little maize or other cereals is grown for supplementary feed, nor is there much cropping to provide special fodder for fattening lambs. Because the weather is unsuitable, rape is seldom ready for feeding off when the lambs are weaned in mid-January. The reliance that is placed principally on grass for butterfat production and lamb fattening is a weakness in the farming methods general in the county.

The area devoted to lucerne is very small considering the suitability of most of the soils and the ease with which this valuable crop can be grown. The lucerne stands are usually productive for 3 or 4 years, after which they deteriorate rapidly through the invasion of grasses because of insufficient or total lack of surface cultivation during hot weather. Lucerne will stand drastic harrowing with penetrating types of harrows which will rip out clumps of grasses such as Yorkshire fog and ryegrass. A cover crop of oats drilled in during the late autumn will provide a ground cover to exclude grasses and weeds; in the spring the combined herbage of lucerne and oats can be made into excellent silage.

**If more attention had been devoted to the cultivation of established lucerne stands from their inception, many which have more or less run out in 7 years or so would still be highly productive.**

## Cattle

The dairy herds are predominantly Jersey or Jersey cross, but there are also some herds of Ayrshires, Shorthorns, and Friesians. All breeds do well in the district, Shorthorns and

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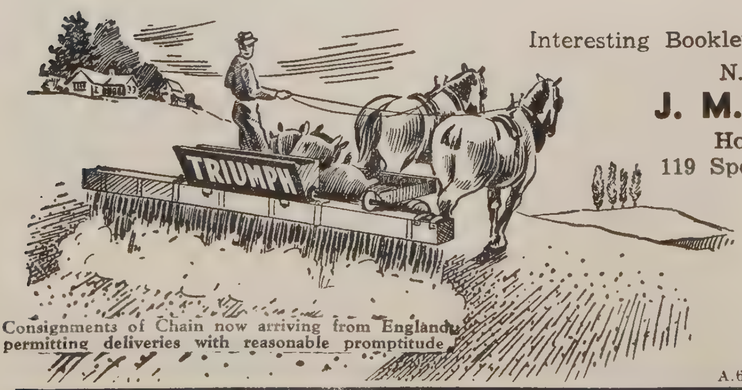

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Friesians being confined mainly to the farms situated on the meadow soil type. There are some good stud herds of each breed, and the progeny command good prices at the annual sales.

There appears to be no great preference for either Polled Angus or Herefords for fattening, but on sheep farms Polled Angus cows are predominant and are mated with either a Polled Angus or a Hereford sire.

### Sheep

The Romney is the predominant sheep breed. On the hill country the Romney ram is used almost exclusively, but on the fat lamb farms both Southdowns and Romneys are used. Every year large numbers of 4- and 5-year-old Romney ewes are brought in from the Waitomo and Kawhia districts, but recently there has been a tendency toward breeding flock replacements on the larger fat lamb farms. Some dairy farmers raise fat lambs as a sideline and also fatten forward store lambs bought in the autumn.

### Pigs

As home separation of cream is the main method of treating milk, the feeding of the skim-milk to pigs is an important branch of dairy farming. The skim-milk is fed with meals or grains to the fattening pigs, which are usually styed to be finished. Store pigs are also supplemented with skim-milk and meals but are allowed greater use of pasture. Though many farmers over-winter store pigs on pasture, home-grown crops, and meals, there are still too many who rely on buying stores and weaners at the saleyards in the spring at very high prices.

The most popular breeds are Tamworth, Large Black, and Berkshire, and there are several good pedigree studs of these breeds. Undoubtedly the most popular cross is the Large Black boar mated with the Tamworth sow, the progeny developing into a large, long animal. The Large White has not gained in popularity; only rarely are white pigs seen in the local pig market.

**STATISTICAL DATA: OTOROHANGA COUNTY, 1943-44**

| | |
|---|---|
| Total occupied area .. | 191,889 acres |
| Area in pasture .. .. | 136,890 acres |
| Area cut for hay and silage | 12,365 acres |
| Area under annual crops | 3,980 acres |
| Dairy cows in milk .. | 31,416 |
| Other cattle .. .. .. | 33,592 |
| Sheep shorn, .. .. .. | 192,376 |
| Pigs .. .. .. .. | 14,590 |
| Number of holdings .. | 747 |
| Average area of holdings | 257 acres |

## AN OTOROHANGA DAIRY FARM

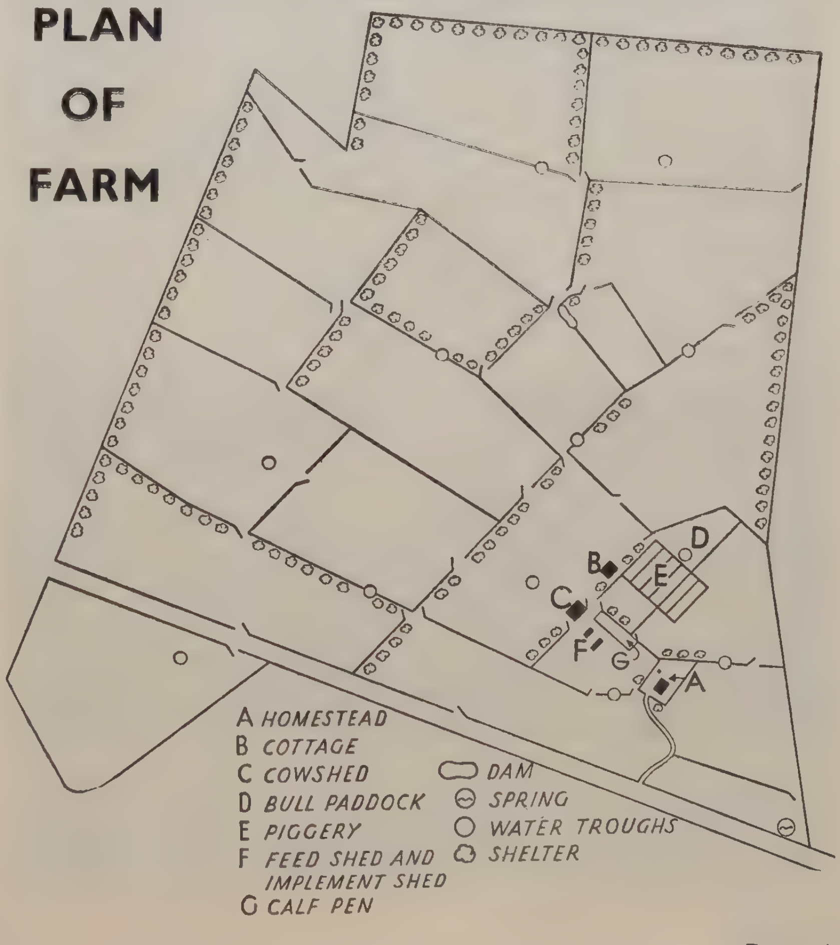
Mr. F. T. Wyllie's dairy farm is 3 miles north-east of Otorohanga on the main highway. In 1924 Mr. Wyllie bought his farm of 85 acres with a leasehold of an adjoining area of 45 acres, the freehold of which he obtained in 1928, giving him a total area of 130 acres. When he acquired the property 120 acres were in grass and the remainder still in bracken fern and manuka. This property is one of the older developed farms of the central area. However, it had been farmed for what could be taken out of it, and the condition of the pastures was so poor that only with considerable difficulty was he able to winter 50 dairy cows in 1924.

For the first few years Mr. Wyllie had to pay considerable attention to the pastures, and he found that about 5 years were required to obtain a satisfactory sward. The soil is the typical brown loam of the central area of the county, and the country is undulating with shallow valleys which provide a little natural shelter for the stock. The farm was not well subdivided, there was no planted shelter, and only a very poor water supply.

Realising that he could not expect to obtain the maximum production from his herd under these conditions, Mr. Wyllie immediately embarked on a programme of development and herd improvement. Each year from 3 to 5 acres of the poorer pastures were ploughed up, cropped with swedes for winter feeding, followed by a catch crop of soft turnips for summer feeding, and then sown to pasture in the autumn. Subdivision was also proceeded with and now there are 23 fields. The fences erected have 3 posts to the chain, 4 battens between each post, and 6 wires, 3 of which are barbed—top, bottom, and fourth from the bottom. With the barbed wire in that order there is no possible chance of the battens getting out of position or the cattle pushing between the wires.

In 1924 there was not a tree of any description on the property and the next year a start was made with the planting of shelter belts of *Lawsoniana* and macrocarpa. They were fenced on both sides, and the draught-proof qualities of the belts show that this policy has been warranted.

In 1935 a start was made with planting barberry and now about 104 chains have been planted. A spade spit was removed, a barberry plant put in each end of the spade cut, and the spit replaced. To deter the cattle from eating the young plants, cow manure from the shed was placed around the plants just before the cattle were turned into the field. The odour of the manure kept the cattle away and the manure supplied plant food to the barberry, which made rapid growth. These barberry belts are allowed to grow about 1ft. above normal fence height, and are trimmed every fourth year.


**PLAN OF FARM**

## AN OTOROHANGA DAIRY FARM

Upper—Typical Otorohanga dairying land with water trough and adequate shelter. Middle—Winter grass: prairie grass, ryegrass, and cocksfoot. Photograph taken September 1, 1946. Lower—The dairy herd.

### Pasture Establishment

During the present owner's occupation of the farm a few acres of permanent pasture have been sown each year, usually in the autumn, as the likelihood of a dry summer must be considered. The grass seeds mixture for permanent pasture has not been varied greatly except that Certified seeds have replaced ordinary commercial lines. The mixture which has been sown is:—

| | lb. an acre |
|---|---|
| Italian ryegrass .. .. | 6 |
| Perennial ryegrass .. .. | 17 |
| Cocksfoot .. .. .. .. | 8 |
| Crested dogstail .. .. | 2 |
| Red clover .. .. .. | 3 |
| Timothy .. .. .. .. | 2 |
| White clover .. .. .. | 2 |
| Total | 40 |

**When Montgomery red clover was introduced Mr. Wyllie replaced ordinary red clover with this strain, but results have been disappointing and he has decided to discontinue its use.**

Preparation of the land for autumn-sown grass usually consisted of double discing and harrowing after the soft turnips had been consumed. Liberal use was made of the roller, the land being rolled before and after sowing of the seed and fertiliser. A dressing of 3cwt. of superphosphate and 2 to 3cwt. of ground limestone an acre was sown with the seed. Grazing of the young pastures in the winter was confined chiefly to young cattle, and the policy of not overgrazing is reflected in dense swards. The previous owner apparently sowed some prairie grass in the seed mixture, and this has been spread over a large portion of the farm from the hay off these fields.

### Pasture Management

The good standard of pastures has been attained by careful attention to factors such as controlled grazing, harrowing, topdressing, and not too frequent haying of the same fields. As pasture growth reaches a stage where stock cannot keep it under control, fields are withdrawn from the grazing rotation and shut for silage or hay.

During the growing season Mr. Wyllie finds that five fields are required for day paddocks and three for night paddocks. The cows are put on for three days or nights at a time and then moved on to the next field. Topping is not a standard practice, but any fields with Californian thistle are mown at least once a year when the thistles are reaching the flowering stage. In April a field is closed for early spring grass so that the freshly-calved cows can be fed a succulent fodder and the production of milk quickly built up. An electric fence is used so that the field can be grazed off in breaks, but recently mowing and carting off the greenfeed would have been advantageous as the growth was prolific and the cows were spoiling a fair proportion of the herbage.

Before the introduction of fertiliser rationing the whole of the farm was top-dressed in February-March with 3cwt. of superphosphate and 2cwt. of ground limestone an acre. Occasionally a few fields received an additional dressing of lime at the rate of 6 to 7cwt. an acre, and others received a dressing of 30 per cent. potash salts at ½cwt. an acre. Mr. Wyllie has also used basic slag, bonedust, and basic slag-superphosphate mixture, but in general he does not believe that the improvement of pasture growth has been greater than when superphosphate and lime were used. No use has been made of nitrogenous fertilisers, nor has liquid manure from the shed been spread on the pastures. As there are no sheep on the property ragwort is controlled with sodium chlorate, and about 3cwt. is used each year. It is mixed with ground limestone and applied to individual plants.

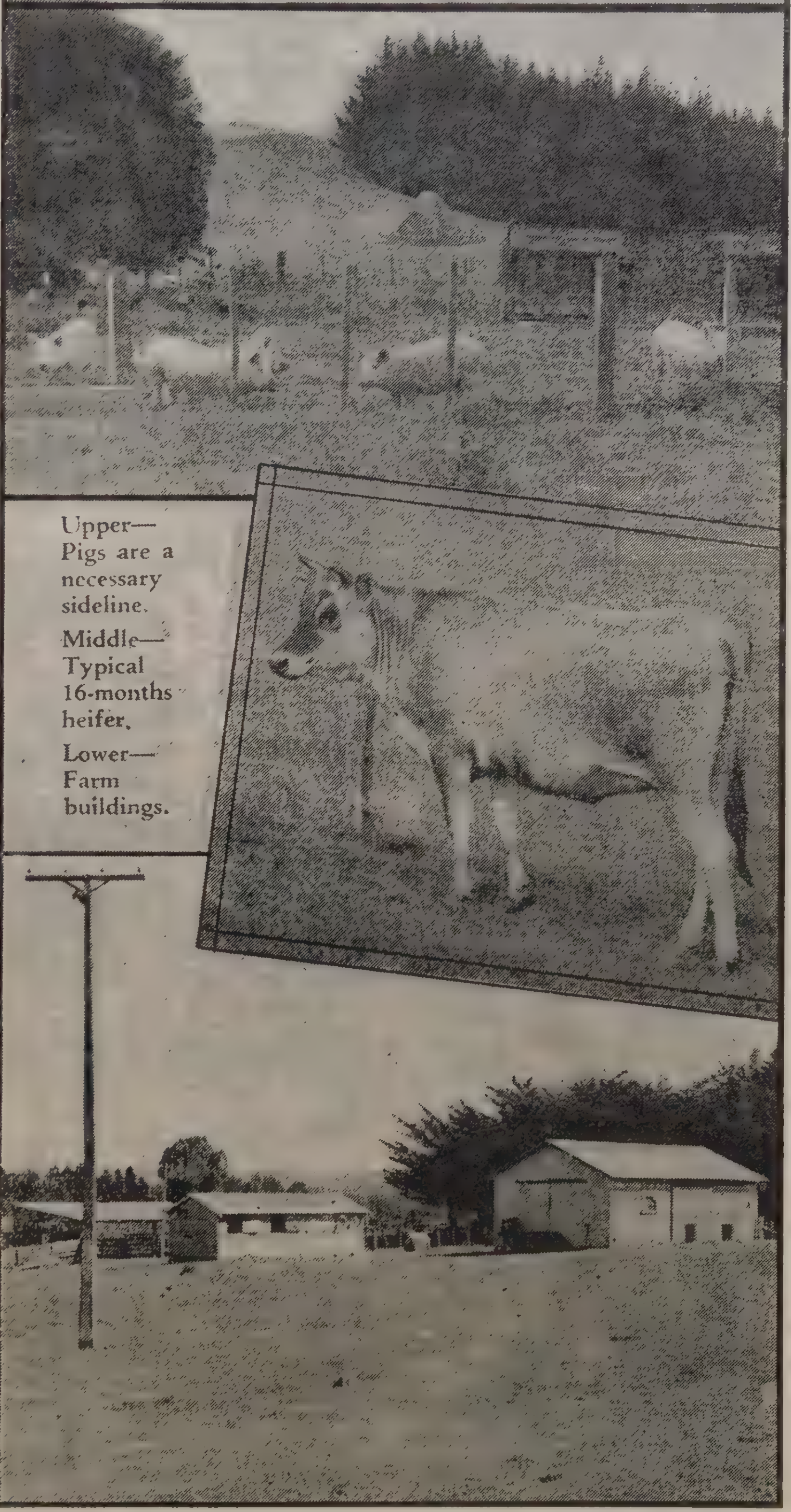
## Silage and Hay

The acreage cut for silage has varied with the area in swedes. In years when a swede crop was grown 8 to 10 acres of silage would be cut, but if there were no swedes for the coming winter, 18 to 20 acres were cut for silage. Silage fields are closed in the middle of September and cutting is begun in the first week of November. Only as much pasture is cut each day as can be conveniently gathered the same day by the labour available on the farm.

**In general, Mr. Wyllie prefers to make his silage in stacks and does not put on any earth, but he builds a good top of really heavy green material. By cutting early he has found that he not only gathers succulent leafy material but that the pastures rapidly recover and are soon back in the grazing rotation.**

Hay fields totalling about 30 acres are closed on October 1 and cutting is begun as soon as the silage making is completed. His aim is to hay leafy material and he does not wait for the pastures to reach the flowering stage. Frequently he has finished the hay harvest by Christmas, with the result that these pastures recover before the dry weather sets in and come back into the grazing rotation. During hay harvesting the programme is arranged so that about 6 acres are cut and almost completely cured before another cut is made. The material mowed the first day is allowed to lie in the swath for two days; on the third day it is tedded in the morning, side raked in the afternoon, and stacked the following day. The stacks are round, and about 10lb. of coarse salt is spread to each ton of hay. The stacks are covered with home-made sheets or wire netting well weighted down.

FARMING IN OTOROHANGA COUNTY



Upper—Pigs are a necessary sideline.

Middle—Typical 16-months heifer.

Lower—Farm buildings.

# AN OTOROHANGA DAIRY FARM . . .

## Cropping

About 3 acres of swedes have been sown practically every year. The land is ploughed in August and allowed to lie fallow till it is surface worked with discs and harrows during October and November. The crop is sown in the first week of December, the rate of seeding being 12oz. an acre and the fertiliser 3cwt. of superphosphate and 2 to 3cwt. of ground limestone.

In the spring, after grazing off of the swedes, the area is ploughed and worked, and a catch crop of soft turnips sown in late October. Three-quarters to 1 acre is sown in a quick-maturing variety, usually Purple Top Mammoth, and the balance in Hardy Green Globe. Rates of seeding and fertiliser are the same as for the swede crop.

## Water Supply

One of the early major works was the installation and extension of the water supply. In 1924 there was a dam near the centre of the farm and a windmill operating over a 35-foot dug well supplying one trough near the cowshed. With the coming of electric power in 1926 a deep well was put down at the cowshed. The water is pumped into a 3000-gallon concrete tank and reticulated over the whole farm from this reservoir. By 1927 every field had a supply of good water in a concrete trough.

## The Dairy Herd

In 1924 Mr. Wyllie began milking with a grade Jersey herd of 50 cows. He produced 11,400lb. of butterfat and reared 15 calves, which is equivalent to about 235lb. of butterfat a cow. In 1925 he began testing, and the following figures have been supplied by the Herd Testing Association:—

| Season | Cows | lb. of fat |
|---|---|---|
| 1925-26 | 49 | 263 |
| 1926-27 | 54 | 335 |
| 1927-28 | 56 | 297 |
| 1928-29 | 57 | 296 |
| 1929-30 | 62 | 328 |
| 1930-31 | 66 | 277 |
| 1931-32 | 66 | 318 |
| 1932-33 | Not tested | |
| 1933-34 | 70 | 323 |
| 1934-35 | Not tested | |
| 1935-36 | 71 | 372 |
| 1936-37 | 71 | 367 |
| 1937-38 | 71 | 330 |
| 1938-39 * | 77 | 283 |
| 1939-40 | 74 | 341 |
| 1940-41 | 74 | 363 |
| 1941-42 | 74 | 360 |
| 1942-43 | 7[illegible] | 344 |
| 1943-44 | 7[illegible] | 335 |
| 1944-45 | 72 | 359 |
| 1945-46 † | 74 | 287 |

* Drought year: 241-day test
† Drought year: 259-day test

**On this farm the production for the 1945-46 season was one-sixth less than the average of the preceding 3 years, whereas the figures for many herds in the county were down by half or more on the 1944-45 season. During the dry period of 1946 the pastures never reached the burnt-out stage—no doubt because of the protection from drying winds afforded them by the excellent shelter belts.**

## Pedigree Cattle

In 1929 a start was made on the breeding of a pedigree herd by buying a rising 2-year-old heifer, Kimberley Josey, in calf to Hawkesbury Gale, and this matron has left some outstanding progeny which form the backbone of the present herd, of which 20 are pedigrees. Her first calf, a bull, proved a very successful sire, three of his daughters as third calvers producing more than 500lb. of butterfat under ordinary herd conditions. Kimberley Josey's pedigree goes back to the well-known imported sire Majesty Fox. She is now 19 years of age and has produced a calf every year except one. She may be considered the foundation of the present herd, as her sons were used for mating with unrelated cows and her daughters and their female progeny have been kept for the herd.

In the early years of the establishment of the herd considerable success was achieved by the use of a very well-bred sire, Pinewoods Standard Gold. A recently-purchased sire, Maori Achievement, a son of Maori Barber, was bred by Mr. C. H. Lepper, Taranaki. This young sire has excellent butterfat backing on both sides of his family and Mr. Wyllie is hopeful that his already good butterfat production will be maintained if not increased in his progeny. The sires are mated from October 8 onward and finish their season by the last week in December.

Herd replacements are all bred on the farm, and each year about 12 heifers are put into the herd. The dairy stock on the farm for the winter of 1946 was 74 cows, 20 rising 2-year-old heifers, 28 yearling heifers, and 4 bulls. Surplus stock are disposed of as rising 2-year-olds.

## Calves

The policy has been to raise all heifer calves and bull calves of pedigree parentage. Calves are fed new milk until they are 6 weeks old, when they are gradually weaned on to skim-milk at 9 weeks. No meals or calf foods are fed while they are on fresh milk, but at 9 weeks they are given a dry ration of crushed lucerne hay, oats, peas, and linseed meal. Rock salt is also placed where they have ready access to it.

At 4 months the calves are weaned from the skim-milk-dry meal ration and put on to good pasture, usually the aftermath of silage cutting. During the winter they are fed a liberal ration of good hay.

## Pig Keeping

The keeping of pigs has not been specialised in but has been considered a necessary sideline to dairy farming. The piggery consists of 6 pens and there are 9 pig houses of the lean-to type. Sixteen to 20 store pigs are wintered with the 6 sows on pasture, skim-milk, roots, molasses, and a little barley meal. Meat meal is fed to the sows with piglets at foot and to the suckling piglets and weaners.

Matings are arranged so that the sows farrow about the first week of July and January. When the cows are dried off surplus porkers or stores above winter requirements are disposed of. About 50 baconers are fattened each year.

The sows are mainly Tamworths, which are mated to a Large Black boar. Mr. Wyllie recently bought an in-pig Large White sow, which produced 11 piglets, and it is his intention to retain 2 sows of this litter for breeding.

## Implements

All the implements are horse drawn and 3 good working horses are kept as well as 2 hacks. The following range of implements is sufficient to work the farm:—

2 single-furrow ploughs
1 side-delivery rake and tedder
1 4-wheel 2-horse sweep
1 set of 3-leaf tine harrows
1 set of 3-horse discs
1 2-horse pole wagon
1 sledge with hay frame
1 topdresser
1 2-horse mower
1 stacker
1 set of tripod and chain harrows
1 9ft. roller
1 cow manure sledge

## Buildings

There are two houses for the owner and his staff; one cowshed with a 4-cow milking plant, deep well pump, skim-milk pump, and 90-gallon separator; one feed shed with 2 loose boxes used for housing new-born calves or sick animals; and a large combined implement and manure shed.

## Labour

The milking, washing up, and feeding of calves and pigs are done by the married couple and the owner or his daughter. No extra labour is engaged for silage gathering, but a neighbour assists at the hay harvest.

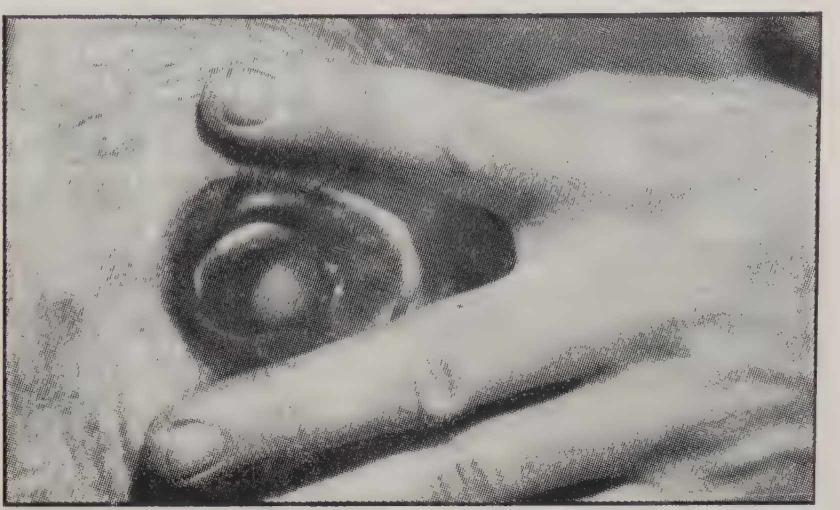
## Conclusion

**Undoubtedly Mr. Wyllie has achieved a very high standard of farming and has put into operation many of the best principles. He has always practised early ploughing and thorough cultivation of the land for roots or grass, the early cutting of silage and hay fields to ensure good aftermaths, the planting of adequate shelter, and the careful selection and rearing of stock.**

# CALVES TEMPORARILY BLIND AFTER PHENOTHIAZINE DRENCHING

*By* L. K. WHITTEN, B.V.Sc.,
*Parasitologist, Animal Research Station, Wallaceville.*

SINCE phenothiazine was first used in New Zealand in 1941 a very large number of calves have been dosed with it with very satisfactory results. During the past two seasons, however, there have been a number of reports of the occurrence of temporary blindness following its use. No abnormality is noticeable the day the animals are dosed, but on the following day they may weep profusely and later develop a milky film over the eye. There is sometimes interference with the animals' eyesight, but in a large number of cases they seem very little disturbed by it, and many cases may pass unnoticed unless a careful examination is made of their eyes. More severe cases may reach the stage of a corneal ulcer. Some check to the growth of the animals is almost inevitable.



Heifer showing opacity of the cornea following the use of phenothiazine.

IN practically all cases so far examined complete recovery occurs without any treatment. In mild cases recovery takes place within 10 days, but in more severe ones a small scar may remain for from three to four months, though this will have very little effect on the animals' eyesight. As the damaged area of the eye is usually situated behind the centre of the pupil, it is less likely to interfere with vision than if it were central in position.

The proportion of dosed animals which have exhibited this condition is probably quite small in relation to the large numbers of animals dosed annually. There have been instances, however, where the majority or even the entire mob on certain farms have become affected, and in such cases its appearance causes the farmer some anxiety. Most cases reported so far have been from the Waikato, Manawatu, Taranaki, and North Auckland districts, but no cases at all have been reported to the Wallaceville Research Station from the South Island.

This condition has been investigated at Wallaceville, where it has been shown that it is caused by the presence in the fluids of the eye of compounds which are formed from phenothiazine in the gut after they have been absorbed into the blood stream. These compounds cause damage under the influence of the ultra-violet light which falls on the eye when the animals are exposed to bright sunlight.

The danger period is between 12 and 36 hours after dosing, and if dull weather is experienced or the animals are kept indoors over this period, damage to the eye does not occur. Where animals are exposed and no damage occurs it is presumably because the sunlight is not sufficiently intense or the concentration of the particular substance involved in the ocular fluids is not sufficiently high.

Most cases occur in January, February, and March, about which time routine drenching is frequently begun in the new crop of calves.

In many instances repeated doses given to the same animals later in the autumn have produced no untoward effects. There are very few records so far of its occurrence in calves more than eight months old.

**The prevention of this condition presents considerable difficulty where animals cannot be kept from bright sunshine, but complete protection is possible if indoor accommodation is available and the animals are kept in it the day after dosing.**

As this condition occurs with comparative rarity, it is not usually necessary to keep animals indoors as a routine after each treatment, but if bright sunshine is experienced the day after dosing, especially in midsummer when the sunshine is richer in ultraviolet light, the calves should be examined closely before the middle of the morning and if any are observed weeping profusely they should all be kept in a barn or shed for the remainder of that day. They may be turned out again in the late evening when the intensity of the sun's rays is greatly reduced. It is not necessary to keep them indoors during the second day after dosing, as by this time most of the material has been excreted.

On many properties in New Zealand on which no indoor accommodation is available some protection may be gained by running the animals in dense bush or in a timber plantation. It should be pointed out, however, that this may not give complete protection, because although the calves show some aversion to sunlight, it is not sufficiently pronounced to make them remain in the shade when only a few trees are present. One hour's exposure in the middle of the day in very fine weather may result in severe damage in susceptible animals.

**It should be emphasised that the condition described above is not very common; it has been described in some detail because it presents some unusual features which were not previously recognised and which prompted the detailed study undertaken at Wallaceville. The risk of temporary blindness occurring, if the correct dose is given and proper precautions are taken, is so small that no one should be deterred from using phenothiazine where it is necessary, since it still remains the safest and most useful worm drench on the market.**

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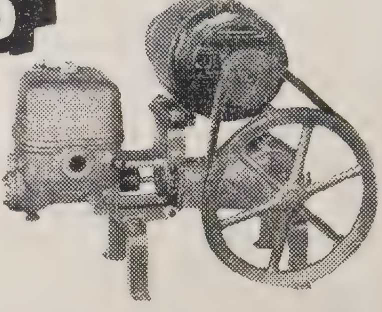

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# FARM WORK FOR MARCH

By the Fields Division

## PASTURES

**Autumn-sown permanent grass.**—In most districts, on both cultivated land and burns, March is considered the most suitable month for autumn sowing of pasture seeds, chiefly because the autumn rains usually begin in that month, providing a fairly uniform supply of moisture to germinate the seeds and keep the young seedlings growing. The temperature is usually fairly high too, and the young plants get a good start. Later sowings often result in poorer establishment because of cold temperatures, and if the sowing is too late, clovers may fail to establish, with the result that the grasses will not thrive and may ultimately die. In any case the resultant pasture is much poorer than it should be and production for the following two years or so is low. The seed-bed should be firm and fine; consolidation is essential for successful clover establishment.

**Italian ryegrass.**—Sown in March except in colder districts and on poorer and heavier soils, Italian ryegrass will provide good supplies of winter feed. It is usually sown with red clover, which provides feed when the ryegrass runs to seed in the early summer. After being grazed in winter the Italian ryegrass may be closed to stock for production of a hay crop.

**Pasture management.** — Paspalum fields should be kept well grazed. As soon as the autumn rains have moistened the ground and softened the dung voided by cattle during the autumn fields should be harrowed to scatter it and spread its beneficial effects. Cattle dung left unspread smothers pasture plants which otherwise would contribute to the early winter supply of feed.

**Topdressing and liming.**—Topdressing with phosphatic and potassic fertilisers where they are needed should be in full swing in March to encourage winter production of pastures. Topdress first fields which are to be closed next month to provide winter feed for the cows as they calve. Fields chosen for this purpose should be in good heart.

Lime sowings should be completed before wet weather causes transport and sowing difficulties.

**Harvesting broad red clover.**—Watch broad red clover crops closely for readiness for harvesting. Cut the crop when 80 to 90 per cent. of the heads are brown. The crop may be cut with a mower and the material left in the swath to dry. It may be headed directly from the windrow during the hottest 2 or 3 hours of a dry, sunny day. If the weather is unsettled or the ground moist, stack the material 10 days after cutting. It can then be threshed with a clover huller after 6 to 8 weeks in stack.

## HAY AND SILAGE

Watch haystacks as they settle and adjust weights holding down covers so that they do not rest on the ground and become useless. Make final adjustments to all stacks early in March to ensure that rain does not penetrate and that fences surrounding stacks are stock proof. Metal tracks from silage pits if they are likely to become boggy in wet weather.

## LUCERNE

New stands of lucerne should be in full growth by now after the first cut. Depending on the weather since then, they may produce another cut next month, but generally they are better left undisturbed till next season.

After old stands have produced the last cut of the season they may be cultivated with penetrating harrows to destroy weeds. If conditions are seasonable for doing so, bare patches may be sown with red clover to lengthen the life of the stand. Red clover may establish and grow well on such patches, but sowings of lucerne usually are not successful and are not recommended. The whole area may be sown with oats, after cultivation, for production of late winter or early spring feed and to suppress weeds which may appear in the stand in the dormant season.

## CEREAL GREENFEEDS

Continue feeding green maize to dairy cows till autumn rains produce sufficient pasture growth for the herd's requirements. Areas which were in maize and millet and were ploughed and cultivated last month can be sown in March in permanent or temporary pasture or in cereals for greenfeed, or they may be left for later sowings such as oats for greenfeed, grain, or chaff in the following month.

Barley sown now will ultimately provide winter and early spring feed. Oat sowings will provide winter and early spring feed in the milder districts and late winter and early spring feed in the South Island and colder districts. The seed-bed for these crops should have been prepared last month and should be fine and firm below and somewhat rubbly on top at sowing time.

## ROOT AND CRUCIFEROUS CROPS

Areas in rape intended for further cropping should be disced to cut up the stalks and make the packed surface friable and then ploughed for the next crop, which may be autumn-sown wheat.

Areas which were in soft turnips for summer feeding to stock should be ploughed ready for the next crop.

Cultivated root crops will have developed far enough by now to require no further attention. See that such crops are well fenced and wire the gates to prevent accidental invasion by stock.

## POTATOES

Watch for the presence of the potato moth during digging operations in areas where infestation may occur. If the moth is present, bag the potatoes as soon as they are dug. Preparation should be made for digging the main crop in the South Island. See that sufficient bags, twine, needles, forks, and implements are on hand to deal with the crop.

## CEREALS AND PEAS

Deep plough in March for autumn sowings of wheat. Harvesting of late cereal crops will still be in progress. The notes in the December "Journal" outlined stages of cutting cereal and pea crops. Stacks of cereals and peas for late threshing should be protected from damage by weather: Peas should be covered with straw and cereals by thatching, particularly if they are to stand for long in wet districts. They should be watched closely for a tendency to lean and measures should then be taken to prevent collapse.

Threshing operations should be closely watched to prevent loss and damage of grain by uneven feeding, too close setting of the drum, or excessive drum speed.

Turn sheep into maize crops grown for cobs to eat out the undergrowth. This keeps the ground clear of weeds, which aids harvesting and helps to prevent diseases assisted by damp, muggy conditions. Arrange for the building of cribs where they are not available or if sufficient space to accommodate the crop is not available in existing cribs.

## GENERAL

Crossings, gateways, and stock lanes should be filled and metalled. Stacks of cereals, hay, and silage should be inspected to see they are weather and stock proof. Wage war on rats and mice in barns now before they cause damage and increase in numbers. See that implements used for harvesting are properly housed or covered and protected from rust by greasing, oiling, and painting.

◆

## LIQUID MANURE

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# PREVENTION OF SCABBY MOUTH BY VACCINATION

*By* J. J. G. PEDDIE, *Bacteriologist, Animal Research Station, Wallaceville.*

**CONTAGIOUS ecthyma (contagious pustular dermatitis) or, as it is more commonly called in New Zealand, "scabby mouth," "scabby nose," etc., is an infectious disease of sheep, lambs, and goats. It is not restricted to New Zealand, but occurs in most parts of the world where sheep and goats are kept.**

THE infection is usually confined to the region of the lips and nostrils (muzzle), and may be conveyed to the udders and teats of milking ewes. The feet of lambs may also become affected in the region of the coronet.

The cause is a "virus" which is a living organism so minute that it cannot be seen even under the highest powers of the ordinary microscope. There are many different viruses which can cause disease, and some of the commonly-known diseases are cow pox of cattle, distemper of dogs, and measles, mumps, and smallpox of humans. Viruses are often called "filter-passers" or filterable viruses, because they are so small that they pass through the very fine pores of special filters employed to filter out ordinary bacteria.

The first symptom noticed is a reddening and weeping of the skin of the lips, and there may be small swellings around the nostrils and sometimes around the eyes and inside the mouth. The skin of the lips becomes swollen, later ulcerated, and finally covered with thick, hard scabs. These eventually drop off, leaving the underlying tissue smooth and without scars. Marked discomfort is shown, eating and drinking become difficult, and affected sheep lose condition and suffer a marked setback, the severity of which is governed by the extent of the lesions and the virulence of the outbreak. The mortality in New Zealand from this disease is negligible, but economic loss may be very serious, especially in a flock of fattening lambs.

Outbreaks of the disease occur chiefly during the spring and summer months, and usually affect lambs and hoggets, but may occur in older sheep which have previously escaped infection. In uncomplicated cases the disease runs a course of about three to four weeks, and on recovery the animal is immune to further attacks.

The infecting virus is resistant to destruction, particularly when in the dried scabs, and may therefore remain alive in scabs on the ground for a long time. The first cases each year probably occur from contact with old scabs dropped in the previous year; spread through a flock occurs from direct contact with affected sheep or from contact with pasture recently contaminated by infected sheep. Slight injury to the skin will assist the entry of the virus, and this accounts for the greater spread of the disease when sheep are grazing near thistle, scrub, or gorse.

Treatment can aim only at alleviating the distress of affected animals and preventing the spread of the disease. Affected animals should be drafted out and isolated. The nostrils should be kept free of discharge to facilitate breathing and the lips cleaned by bathing in warm, mildly antiseptic solution such as 5 per cent. copper sulphate. The lips should be softened by application of fatty ointments such as lard or petroleum jelly containing a very small amount of carbolic.

**The loss of condition in sheep, the time taken in attending to affected animals, and the pain and distress of afflicted sheep can all be prevented by vaccination. The object of vaccination in this disease is the same as in other diseases; an attack of the disease is artificially induced in such mild form that no symptoms occur, and yet resistance is developed so that the animal is not vulnerable to later attacks by the disease-producing agent.**

A suitable vaccine for treating scabby mouth is made from the scabs which contain the virus. Scabs are obtained preferably from the lips and are thoroughly dried and ground very finely. The fine dried powder will retain its power to infect for a long time. When it is suspended in a suitable diluting fluid and applied to the scratched skin of an animal which has not previously had an attack it will set up the disease. If infected material containing the virus is applied to any part other than the nose and mouth, the response is mild and almost unnoticed, yet the animal becomes immune to all later attacks. This fact is taken advantage of in vaccination and the suspended powder is applied to the bare skin inside the thigh after lightly scratching the area.

The vaccine is issued in two parts—one containing the vaccine proper (the dried and finely-ground scabs), the other the diluting fluid. These should be mixed only immediately before use, as deterioration occurs after mixing and vaccinating properties are rapidly lost. For best results it should be employed within 24 hours of mixing. Farmers usually find it more convenient to vaccinate at marking time.

The most suitable procedure is to use a large darning needle, the sharp end of which is pushed into a cork and the tip of the eye filed off to leave a double prong. The powder and diluting fluid are mixed and kept well shaken. The prongs of the vaccinating needle are dipped into the mixture and a small drop of vaccine adheres on withdrawing. Vaccination consists of scratching the bare skin on the inner side of the thigh by drawing the prong across.

Outfits issued by the Department of Agriculture consist of one bottle of powdered vaccine, one bottle of diluting fluid, a prepared needle, and a sheet of instructions.

The growing popularity of the vaccine is illustrated by the following table showing the number of doses issued in the last few years:—

DOSES ISSUED.

| | |
|---|---|
| 1942 .. .. .. | 15,500 |
| 1943 .. .. .. | 40,150 |
| 1944 .. .. .. | 23,750* |
| 1945 .. .. .. | 112,400 |
| 1946 .. .. .. | 163,500† |

* Owing to lack of scab material 40,000 additional doses could not be suppled.

† Eight months only.

**It is certain, however, that in spite of the large number of applications received for the vaccine, a great number of farmers still do not know of its availability or of its effectiveness. This article is addressed especially to those, and it is strongly recommended that in all cases where scabby mouth is suspected the local Government Veterinarian or Inspector of Stock be consulted. In urgent cases application may be made direct to the Animal Research Station, Wallaceville. Though the best procedure is to vaccinate lambs at docking time, there is evidence that an outbreak can be arrested if the unaffected animals are vaccinated.**

By vaccinating at docking time complete prevention of scabby mouth in lambs can be achieved for that season. The vaccine is issued free by the Department of Agriculture and can be obtained from the Animal Research Station, Wallaceville, either direct or through district veterinary officers or stock inspectors. All farmers whose lambs have become affected in the past by this disease should avail themselves of this service. This article describes the disease and the simple vaccination procedure by which it is prevented. To ensure a continuous supply of scabs for vaccine preparation farmers are requested to send scabs from the lips of affected sheep direct to the Animal Research Station, or through Government Veterinarians or Stock Inspectors.

# CONTROL OF PULLORUM DISEASE IN POULTRY

*By* F. C. BOBBY, *Superintendent of Poultry Husbandry, Wellington.*

DURING the past five years the Department of Agriculture has pursued a campaign of testing poultry breeding flocks for pullorum disease. Considerable success has been achieved during this period, but a still greater response from poultry producers is needed if the desired control of this disease is to be effected. The progress indicated in this survey of the work carried out so far should act as an inducement to those who have yet to accept blood testing as essential. The information will also be of interest to poultry producers who have tested their breeding stock in past years.

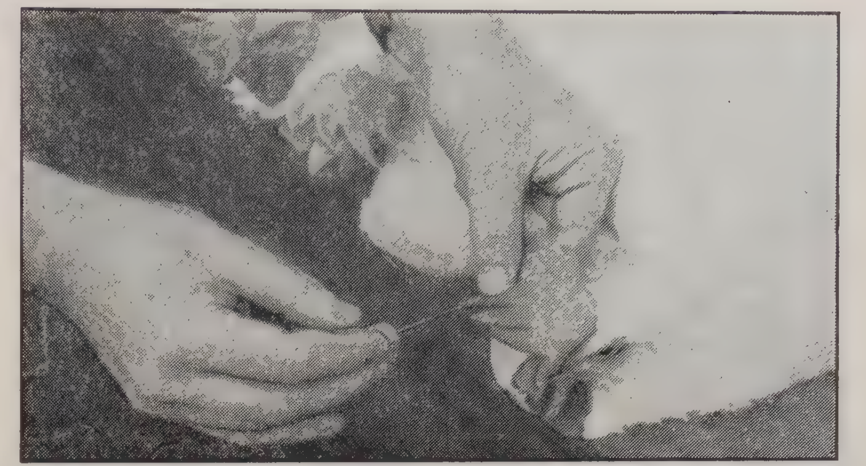

Fig. 1—Taking the sample of blood.

PULLORUM disease is common in all poultry-producing countries. Fowls and turkeys are commonly affected, but ducks and geese are resistant and infection is rarely recorded. Pullorum is normally a disease of young chickens and frequently results in heavy mortality during the first 10 days of brooding, but serious losses among adult birds have been recorded. Fortunately serious trouble among grown birds has not been recorded in New Zealand so far.

## Method of Transmission

The disease is caused by a bacterium known as *Salmonella pullorum* and infection may be spread in a number of ways between chickens or adult stock. The most important method of transmission, however, is from the breeding hen to her chicks through hatching eggs, but misunderstandings about this still exist.

**A hen may be affected with pullorum disease in her ovary and yet show no outward sign of suffering from this disease. Such a hen will appear normal in all respects, may have an excellent egg production record as a pullet, and will in consequence be included in a breeding pen on merit. Yet the hatching eggs from this bird are likely to contain the disease organisms and, should they hatch, the chicks may die from pullorum disease. Chicks so infected from their mother are not only likely to die but are also a source of infection for healthy chicks. In this way a batch or brood of apparently healthy chickens may become infected. The chance of an outbreak of pullorum disease among chickens is directly influenced by the number of infected or "carrier" hens in the breeding flock.**

## No Scouring in Adult Birds

Pullorum disease was originally called B.W.D., bacillary white diarrhoea or white scour. These terms refer to the disease as it affects chickens, in which it produces a white diarrhoea or scour, but this condition does not apply to adult birds. In both male and female adult birds the disease organisms are usually located in the sexual organs and consequently do not cause scouring. The belief is still held by some poultry producers that their breeding birds are free from pullorum disease because no signs of a white scour have been observed.

Though "carrier" hens cannot be detected by outward appearances, fortunately it is possible to identify infected birds by a comparatively simple and efficient test and thus prevent them from being included in a breeding pen. By this test the Department has been able to identify thousands of "carrier" hens, most of which would have been included in breeding flocks.

All communications about blood testing should be addressed to the "Poultry Instructor, c/o the Department of Agriculture," at one of the following centres:—

Auckland (three instructors);
Hamilton (one instructor);
Palmerston North (one instructor);
Hastings (one instructor);
Wellington (two instructors);
Christchurch (two instructors);
Oamaru (one instructor);
Dunedin (one instructor).

No effective treatment for chickens suffering from pullorum disease is known, but in any case it is obvious that prevention by removing the "carrier" birds is the soundest method of control.

## Method of Testing

The method of testing birds in New Zealand may be described briefly as follows:—

A drop of blood is obtained from the comb of the bird to be tested by snipping a very small piece of comb with scissors (Fig. 1). A drop of what is termed pullorum antigen is placed on a clean glass slide or plate (Fig. 2), and to this is added the blood drawn from the comb (Fig. 3). The two are mixed by gently tilting the glass slide (Fig. 4). The glass slide is placed on top of a hot water tank, as it is desirable that the blood and antigen be kept at about blood heat. Within about a minute it is possible to decide from the appearance of the blood and antigen whether the bird being tested is infected with pullorum disease. If the bird is not infected, the spot on the glass slide remains unaltered, but if infection is present, the mixture of blood and antigen clears, leaving clumps of cells in the liquid. These clumps are clearly visible, as the antigen contains a purple stain which colours the clumps and leaves the surrounding liquid clear.

Fig 5 shows tested blood from a healthy bird and an infected bird. Birds which are infected and react to the test are termed "reactors" and are the "carrier" birds referred to previously.

**Officers of the Department are responsible for carrying out this test, and any poultry producer wishing to have his birds tested should apply in writing to the poultry instructor for his district.**

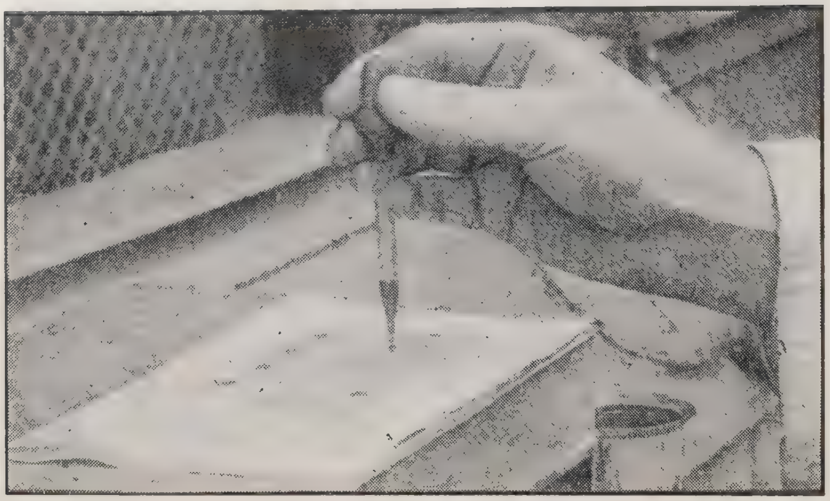

Fig. 2—Plating out the antigen.

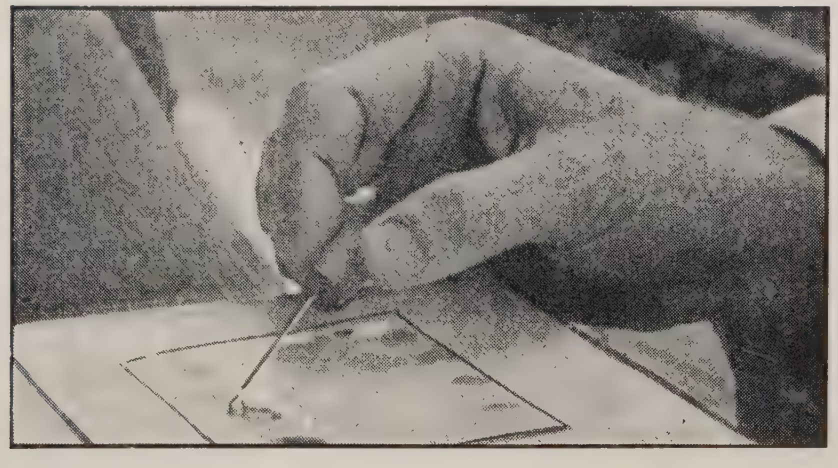

Fig. 3—Blood is added to the antigen.

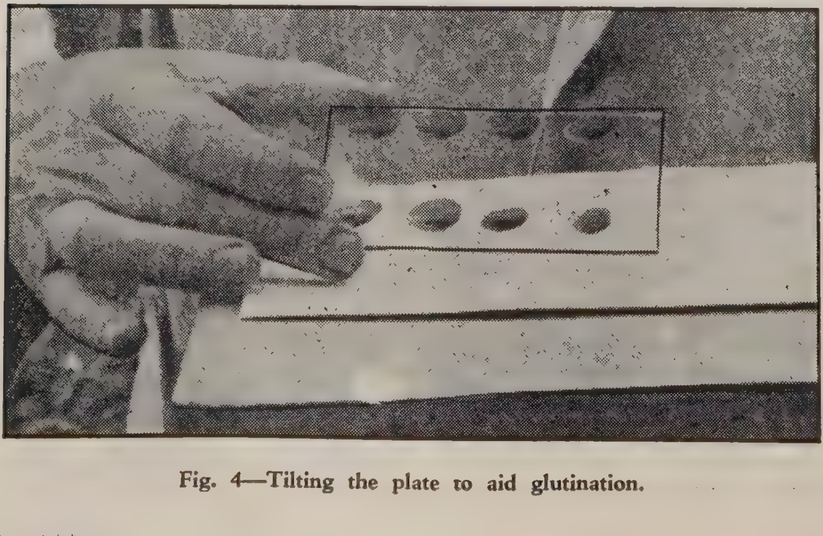

Fig. 4—Tilting the plate to aid glutination.

**A small charge is made for the antigen required for the test, but the work of testing is done free by Departmental officers.**

## When to Have Birds Tested

Birds should be tested while their ovaries are active—that is, while they are in lay. The primary object of testing is to ensure that no birds included in a breeding pen are infected with pullorum disease. Therefore it is customary to test all birds set aside as probable breeders, and, as the initial selection of such birds usually takes place early in the year, blood testing is in full swing between January and June.

The testing of breeding stock undoubtedly gives reasonable protection against outbreaks during the rearing season, but unquestionably, if a poultry producer wishes to rid his flock completely of pullorum infection, hens and pullets alike should be tested annually. The testing of in-lay pullets presents some difficulties, and any producer contemplating testing all the birds on his farm should first discuss the subject with the poultry instructor for his district.

Tested and untested birds should never be brought into contact with each other, nor should tested birds be run in a house on litter used by untested stock. Infected birds among the untested stock are likely to infect healthy tested birds.

**Reactors should not be retained on the farm. It is obvious that reactors sold through public auctions or to any person who may use them for breeding purposes are likely to spread the disease and thereby undo much of the good accruing to the industry from the present drive to reduce its incidence in New Zealand.**

## The Disease in New Zealand

There are some indications that the virulence or deadliness of pullorum disease in New Zealand is less than in some other poultry-producing countries. A breeding flock in, say, the United Kingdom containing more than 10 to 15 per cent. of reactors will produce chickens among which pullorum outbreaks will occur sporadically or even with each hatch. In New Zealand, on the other hand, greater percentages of reactors have been found in breeding flocks where chick rearing has been reported to be satisfactory. In such cases it is usually observed that the poultry producer is a good chick rearer and has efficient rearing housing and equipment. Day-old chicks sold from such a farm and reared less efficiently frequently show increased mortality, which laboratory investigation proves to be caused by pullorum infection.

## TESTING BLOOD FOR PULLORUM

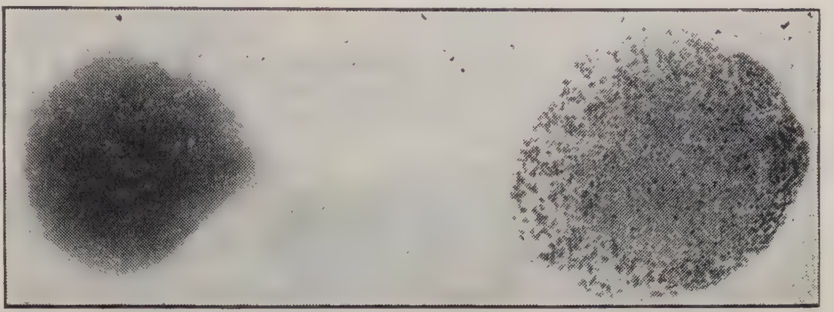

Fig. 5—Left—No reaction; bird healthy. Right—Positive reaction; glutination apparent, indicating a pullorum "carrier."

Thus it is reasonable to argue that day-old chicks from breeding flocks containing reactors carry the disease organisms, but that under first-class rearing conditions these organisms may remain inactive. Under poor conditions, on the other hand, these organisms become active, resulting in mortality from pullorum disease. This explanation will appear logical to those who have experienced no serious losses from pullorum disease on their own farms but have been faced with complaints of pullorum outbreaks among chicks sold to other producers. Where producers who previously experienced these baffling circumstances have had their breeding flocks blood tested and reactors removed no further complaints have been received, or at the worst their number has become negligible.

Another aspect of the behaviour of pullorum disease in New Zealand is of interest. Overseas the disease spreads very rapidly in cabinet incubators; one batch of disease-carrying chicks hatched in an incubator is likely to infect a large proportion of the disease-free birds. From observations in New Zealand the risk of infection in this manner is far less than that recorded overseas.

**It must be emphasised, however, that the fact that pullorum disease is apparently less virulent in New Zealand is no justification for relaxation in blood testing. No assurance can be given that the disease may not become just as virulent in future as it is overseas. Losses from pullorum disease in the past were heavy and losses still continue. It is essential to bring this disease under control before it can become a scourge in the industry.**

## Survey of Past Work

Before 1941 the number of birds tested in New Zealand was negligible, and even in that year only 684 were tested. Table I sets out the number of birds blood tested in the years following, recorded under the four main provincial areas as usually recognised in the poultry industry.

**TABLE I: NUMBER OF BIRDS BLOOD TESTED FOR PULLORUM DISEASE**

| | 1942 | 1943 | 1944 | 1945 | 1946 |
|---|---|---|---|---|---|
| Auckland .. .. .. .. | 11,478 | 2,627 | 12,253 | 25,449 | 33,931 |
| *Wellington .. .. .. .. | 4,726 | 6,941 | 34,515 | 61,453 | 65,075 |
| Canterbury-Westland .. .. | 544 | — | — | 11,589 | 13,690 |
| Otago-Southland .. .. .. | 215 | — | — | 11,131 | 19,957 |
| Dominion .. .. .. .. | 16,963 | 9,568 | 46,768 | 109,622 | 132,653 |

* Wellington includes Taranaki, Manawatu, Gisborne, Hawke's Bay, Blenheim, and Nelson.

The fall in numbers for 1943 is considered to have been caused by the particularly difficult conditions which followed the entry of Japan into the war, but the table indicates clearly the big increase in numbers of birds tested during the past five years. In considering the numbers of birds tested in each area it is interesting to note the census figures for 1945 expressed in percentage form:—

| | per cent. |
|---|---|
| Auckland .. .. .. | 37.6 |
| Wellington .. .. .. | 28.5 |
| Canterbury-Westland .. | 19.4 |
| Otago-Southland .. .. | 14.5 |
| | 100.0 |

These figures exclude ducks.

Table II shows the number of farms on which blood testing was carried out, irrespective of the size of flock maintained. It shows a satisfactory expansion of the service, but indicates the need for an increased interest in the South Island. The total of 367 farms visited for blood testing in 1946 is still small in relation to the number of commercial flocks in the Dominion.

**TABLE II: NUMBER OF FARMS WHERE BIRDS WERE TESTED**

| | 1942 | 1943 | 1944 | 1945 | 1946 |
|---|---|---|---|---|---|
| Auckland .. .. | 10 | 5 | 15 | 68 | 88 |
| Wellington .. | 9 | 11 | 82 | 163 | 193 |
| Canterbury-Westland | 1 | — | — | 20 | 45 |
| Otago-Southland .. | — | — | — | 21 | 41 |
| Dominion .. .. | 20 | 16 | 97 | 272 | 367 |

Records have also been kept of the numbers of reactors found in flocks throughout the Dominion, and during the past two years these details have been increased by records according to the sex, age, and breed of birds. Table III and IV set out these data in detail, and show that in the past five years blood testing has removed from New Zealand flocks 26,935 potential breeding birds infected with pullorum disease. They also indicate that the percentage of reactors is showing a satisfactory decrease.

**TABLE III: DOMINION TOTALS OF BIRDS TESTED AND REACTORS RECORDED**

| | Birds tested | Number of reactors | Percentage of reactors |
|---|---|---|---|
| 1942 .. | 16,963 | 1,970 | 11.6 |
| 1943 .. | 9,568 | 629 | 6.5 |
| 1944 .. | 46,768 | 5,711 | 12.2 |
| 1945 .. | 109,622 | 9,888 | 9.0 |
| 1946 .. | 132,653 | 8,737 | 6.5 |
| | 315,574 | 26,935 | |

**TABLE IV: DOMINION TOTALS OF BIRDS TESTED BY BREEDS**

| | 1942 | | 1943 | | 1944 | | 1945 | | 1946 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Birds tested | Percentage of reactors | Birds tested | Percentage of reactors | Birds tested | Percentage of reactors | Birds tested | Percentage of reactors | Birds tested | Percentage of reactors |
| White Leghorns | 4,254 | 13.5 | 6,410 | 3.4 | 37,566 | 9.2 | 87,218 | 7.5 | 107,084 | 5.8 |
| Black Orpington | 3,150 | 19.5 | 2,335 | 15.2 | 10,249 | 17.1 | 20,820 | 12.6 | 20,417 | 10.1 |
| Rhode Island Red | 1,331 | 13.5 | 639 | 7.8 | 2,097 | 9.1 | 2,680 | 9.3 | 2,304 | 13.0 |

Only the three most popular breeds are listed, as the numbers of all other breeds are comparatively small.

Finally the figures are analysed in respect of sex and age, but only data for 1946 are available at present:

**TABLE V: REACTORS ACCORDING TO SEX AND AGE**

| | Number tested | Percentage of reactors |
|---|---|---|
| Hens .. .. | 107,514 | 7.3 |
| Pullets .. .. | 16,834 | 5.0 |
| Cock birds .. | 1,071 | .84 |
| Cockerels .. | 7,234 | .58 |

## Testing of Males

In view of the small percentage of reactors among male birds the question has been raised whether it is necessary to test them. An infected male may easily spread the pullorum to disease-free females or to other males in a mass-mated flock. An infected male—and these are found from time to time in most flocks—must always be a source of danger while retained on the farm. For that reason it is desirable to test male birds annually.

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# PORKER & BACONER COMPETITIONS

## North Island Results Analysed

*By* D. M. SMITH, *Assistant Research Officer, Animal Research Station, Ruakura.*

DESPITE drought conditions over a large part of the North Island, the 1946 Tomoana porker and baconer competition was very well supported by pig producers, and again a large amount of detailed information is available for examination. Though quantity is still of prime importance, a warning has been given about quality, and from the viewpoints of both the industry and the individual it is timely.

FOR the industry in general and the individual producer in particular these competitions can provide reliable information about any improvement in quality being achieved and where the greatest need for improvement lies. For those who wish to produce better pigs, the display of winners shows which strains will help to achieve that aim.

This analysis does not deal with the standard of individual groups, but with the average quality of all the groups. The average quality, and not a few good pigs, decides the industry's market, though the poor animals in any line tend to lower the value of the group below the general average.

### Judging Standards

The new pork-judging standards were in use for the first time in 1946, and the Tomoana competition was the first real testing ground, so a discussion of judging standards and their aims is appropriate.

When an article is placed on sale in the open market in competition with similar articles, one of several things can happen to it: If it is a superior article, it may oversell all competitors; if it is not a superior article, it may find a restricted market at a lower price, or it may not sell at all. In either of the last two eventualities the producer can do one of two things: He can take up some other business, or he can satisfy the market by producing the goods the buying public wants. It is quite immaterial whether the producer himself likes the type of article required by the consumer.

**Both the pork- and bacon-judging systems are based on a knowledge of the type of article demanded by the English consumers and being provided by New Zealand's competitors. It is of little interest to the consumers that the Waikato or Taranaki or any other group of farmers does not favour that particular type of animal, for if the country does not provide its customers with what they desire, it can only sell at a lower price or retire from the market. Criticisms of the judging methods unfortunately fail to take these considerations into account.**

### Chest Depth and Constitution

At least one of the characteristics included in the system, balance of side in baconers, has been the subject of some comment. The suggestion has been made that with a reduction in depth through the chest pigs will lose constitution.

The reason behind the demand for a reduced depth is that a triangular side when rolled is ugly, it involves a lot of waste and consequent loss to the retailer, and the bacon is difficult to sell because the customer does not favour the forward end of such a roll. If New Zealand bacon is to be sold to the best advantage, if retailers are to be happy in the selling of the product and come back for more, the pig must be parallel between back and belly—shallow and long.

The critics' counter is that there is no point in satisfying a market at a loss, and that if pigs lose constitution, production will be uneconomic. The answer to such criticism is difficult because the term "constitution" has many definitions. If a general definition is "the ability to survive under shocking conditions of housing and feeding," then pig keeping with pigs parallel top and bottom may be uneconomic. But if the term is accepted as meaning the ability to farrow large litters and feed them well, and bring large litters quickly to bacon or pork weights under good conditions, then the sceptics have little to fear.

The Scandinavian countries, which have been and will probably continue to be New Zealand's competitors on the English market, have been practising selective breeding since 1909 and, among other things, carcass quality has been a basis of selection. The aim has been to use as breeding stock animals that, by the performance of their litter mates on the hooks and their own appearance at bacon weight, have proved as far as it is possible to prove that they are bacon pigs. In other words, when a sow or boar is selected to breed bacon pigs, bacon pigs are chosen, and from Danish records prolificacy has tended to improve, not to decline.

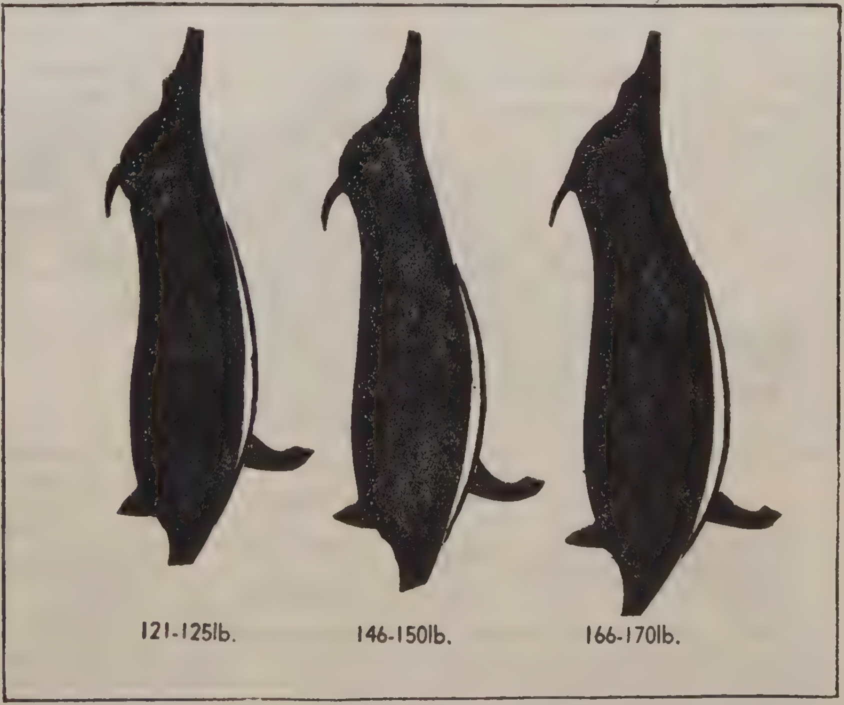

Fig. 1.—The black part of the carcass shows the correct depth for the average length of pig in each weight class. The black part plus the white area shows the actual depth of pigs in each class.

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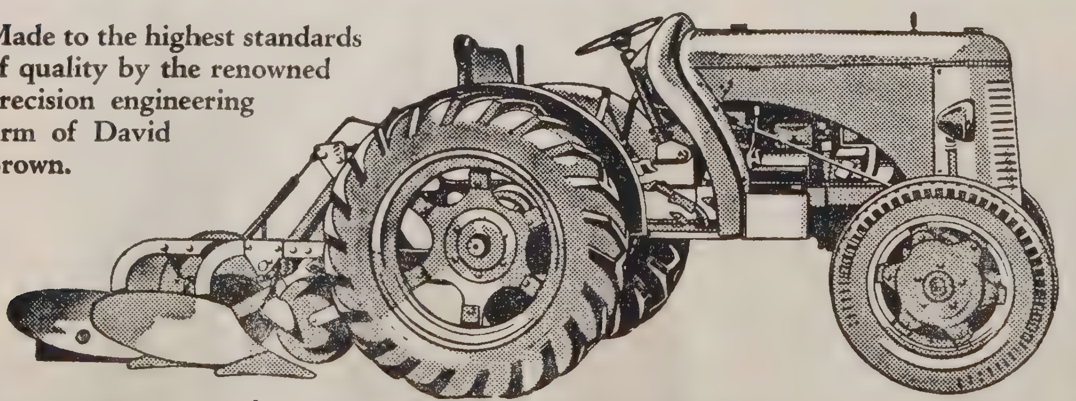

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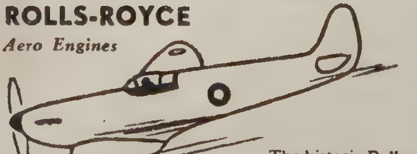

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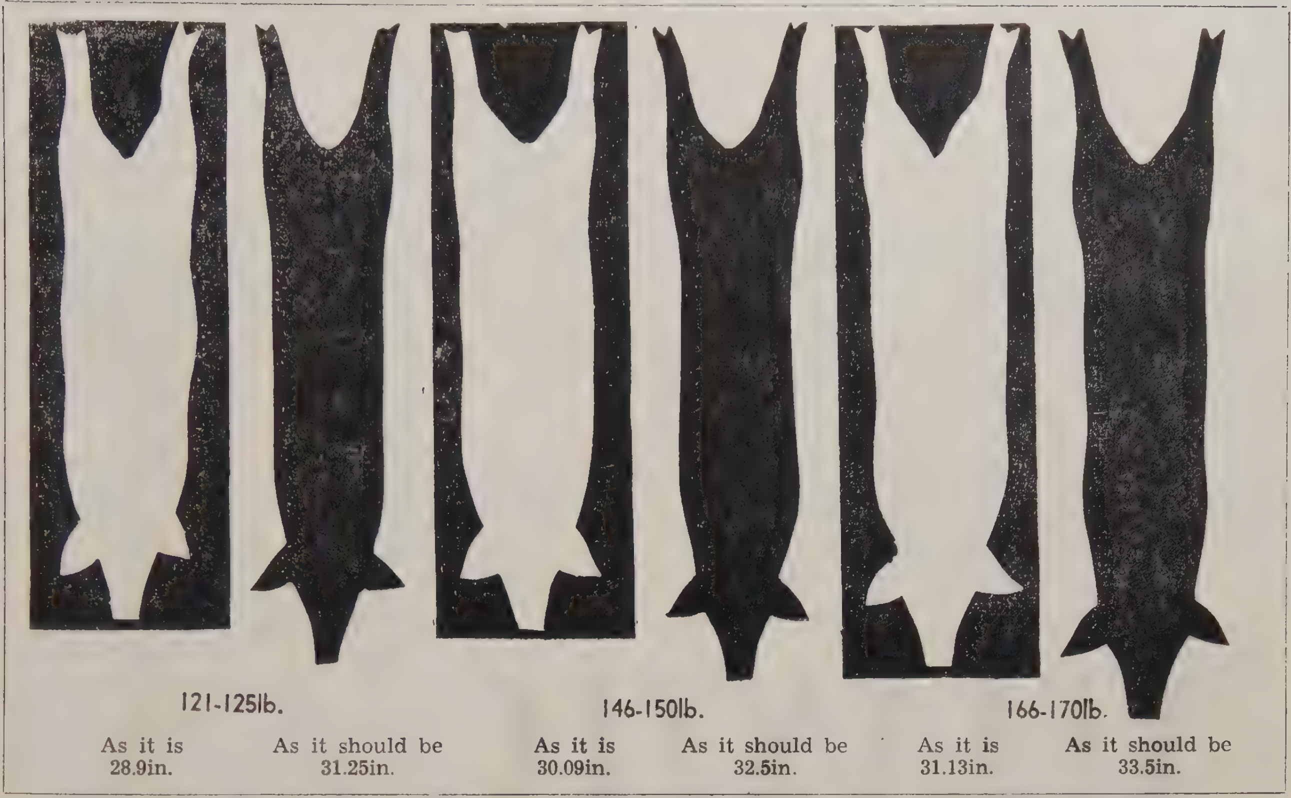
121-125lb.
As it is
28.9in.
As it should be
31.25in.
146-150lb.
As it is
30.09in.
As it should be
32.5in.
166-170lb.
As it is
31.13in.
As it should be
33.5in.

Fig. 2.—A comparison of the average lengths of baconers with the desired lengths for the same weight classes.

**If the average farmer will realise that he is not breeding pigs to win a marathon or perform manual labour, the impression that the chest expansion of a sow indicates her ability to reproduce and feed a litter may be eliminated. New Zealand's competitors are getting their relatively shallow-chested pigs by breeding from animals of that type.**

Fig. 1 shows how New Zealand baconers fail to measure up to the standards set down as optimum for depth of side. It gives only an indication, as it is based on average length and average depth within weight ranges, whereas points are awarded under the system not for weight but for length.

Though Fig. 1 indicates that baconers are relatively poor in balance of side, the position with porkers is somewhat better. Table I illustrates that point, and shows that as the weight increases the discrepancy between actual and optimum increases. As shown in Fig. 1, that carries on through the bacon-weight classes as well.

TABLE I.—PORKERS

| Weight range (lb.) .. | 61-65 | 86-90 | 116-120 |
|---|---|---|---|
| Average length (inches) | 24.9 | 26.8 | 29.0 |
| Average depth (inches) | 10.3 | 11.1 | 12.4 |
| Optimum depth (inches) | 10.1 | 10.8 | 11.6 |

## Length of Carcass

Emphasis on length is still as important and requiring of attention as ever. Fig. 2 and Table II show the position in regard to this characteristic and indicate how much ground must be made up if New Zealand is to produce the ideal baconer. But they also show that length is not as weak a characteristic in porkers as in baconers.

TABLE II.—PORKERS

| Weight class (lb.) .. | 61-65 | 86-90 | 116-120 |
|---|---|---|---|
| Average length (inches) | 24.9 | 26.83 | 29.05 |
| Optimum length (inches) | 26.37 | 28.25 | 30.5 |

## Back Fat

Table III forces the conclusion that to produce pigs with the correct amount of back fat still requires the maximum of managerial ability in feeding, apart from considerations of breeding.

In the porker weights the shoulder fat is below optimum for carcasses up to 90lb. and optimum for the range 91-105lb. The 106-120lb. class shows an excess of fat at the shoulder. All classes are below the optimum for loin fat.

All bacon classes show an excess of both shoulder and loin fat, though in no case is the excess very great. In general, for all three characteristics—length, balance of side, and back fat—the porkers were of better average

TABLE III

Average back fat measurements in 1-16in.

PORKERS

| Weight range (lb.) .. .. .. .. .. | 60-75 | 76-90 | 91-105 | 106-120 |
|---|---|---|---|---|
| No. of pigs | 339 | 4[illegible]3 | 276 | 84 |
| Shoulder fat | 11.6 | 13.9 | 16.5 | 18.1 |
| Optimum | 13-14 | 14-15 | 15-16 | 16-17 |
| Loin fat | 6.5 | 7.7 | 9.7 | 10.7 |
| Optimum | 8 | 9 | 10 | 11 |

BACONERS

| Weight range (lb.) .. .. | 121-130 | 131-140 | 141-150 | 151-160 | 161-170 |
|---|---|---|---|---|---|
| Number of pigs | 201 | 258 | 284 | 161 | 127 |
| Shoulder fat | 25 | 26.3 | 27.0 | 28.1 | 29.6 |
| Optimum | 20-23 | 21-24 | 22-25 | 23-26 | 24-27 |
| Loin fat | 13.7 | 14.8 | 16.0 | 18.3 | 19.0 |
| Optimum | 12 | 13 | 14 | 15 | 16 |

quality than the baconers. However, the loin fat or finish on the porkers should be improved.

### Pig Council Competition

The Pig Industry Council section, included in the main carcass competition, was a worthy attempt to round off competitive carcass exhibitions. The consumers' demands must be met, but it is obviously preferable that they be met by using an animal not only of superior carcass conformation but also of high productive ability. The main economic factors to be considered in pig production are the number in a litter; the number weaned; the weaning weight, which is an indication of the milking and mothering ability of the sow and the management of the farmer; the growth rate throughout the animal's life; and last the carcass quality of the slaughtered pig. For a group of four pigs possible points for prolificacy, litter weight, and growth rate are 200. Possible points for carcass are 400, so the emphasis is still on the quality of the product.

A competition such as this is the logical goal of all methods of pig improvement, and those seeking breeding stock should go to the breeders of pigs that satisfy all the requirements. Unfortunately, very few entries were received for this section, and the results represent a highly-selected group rather than a cross-section of the pig population. It is to be hoped that this competition will attract many more entries in future.

### Summary of Competition

In general, the results of the competition may be summarised as follows:—

**Balance of side:** This characterisitic became progressively worse as the pigs became heavier. There is need for considerable improvement in this feature, especially in baconers.

**Length:** This characteristic is still weak, especially in baconers.

**Back fat:** Loin and shoulder fat in porkers is too thin in the light weights, but the shoulder fat passes the optimum at 95lb., and from that weight on carcasses are too fat. Baconers are too fat at both shoulder and loin in all weights.

**General quality:** That of porkers was higher than that of baconers judged on the preceding three characteristics.

### Report from Smithfield

The report of a display of carcasses sent to England from the Tomoana porker and baconer competition last July, and exhibited at Smithfield, makes encouraging reading.

Dr. J. Hammond, who, with Mr. H. E. Davidson, inspected the pigs, was most enthusiastic. 'The standard is very high," he said, "higher even than last year, when the prize-winning carcasses were displayed in a London cold-storage house. An excellent attempt has been made to secure uniformity of animals. This system will enable us to establish grades for New Zealand pigs in the same way as we have grades for lambs, and this will be of distinct advantage to the trade."

## Pedigree Hereford Bull from Canada

THE first pedigree Hereford bull to be imported into New Zealand since before the war arrived from Canada recently. It was purchased for 5,000 dollars (£NZ 1538) by Mr. F. M. Brice, stud farmer of "Waimutu," Marton.

Bred by Mr. W. A. Crawford-Frost, Caerleon, Nanton, Alberta, the bull, which is named Caerleon Standard 26th, was champion at the Calgary Agricultural Show last June. It brought the top price at the Calgary sale, one of the biggest stock sales in Canada, and was subsequently purchased privately by Mr. Brice.

Caerleon Standard 26th is 2½ years old and is a high-quality specimen of its breed. It is perfectly marked, and has rich dark red colouring, but is shorter than most New Zealand bulls.

Owing to delays caused by waterfront disputes in San Francisco the bull was on board ship for 70 days, but was quite healthy when it arrived.

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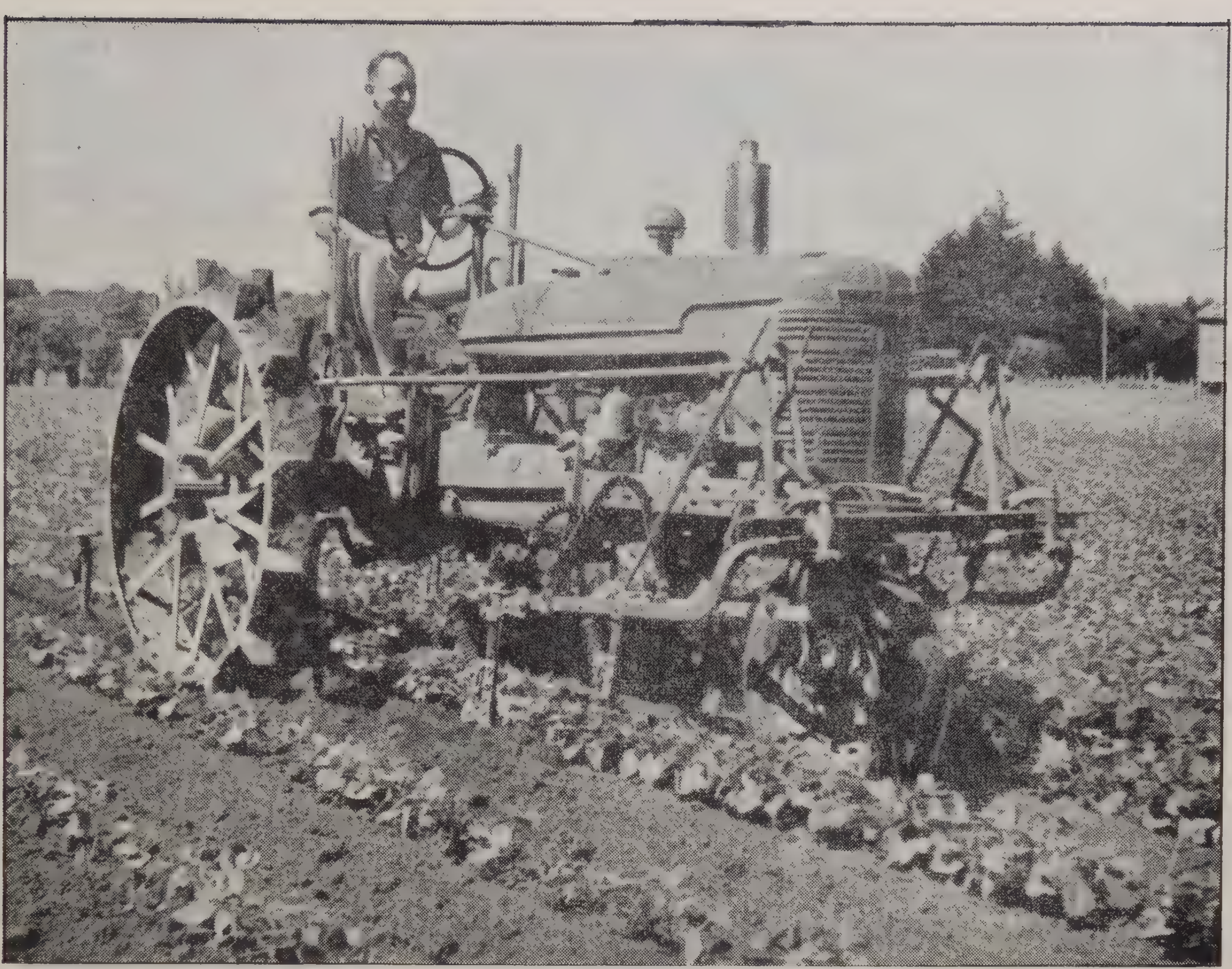


# TRACTOR INTER-ROW CULTIVATION

## Methods and Equipment Used at Patumahoe

*By* J. H. HITCHCOCK, *Fields Instructor, Patumahoe.*

**TRACTOR inter-row cultivation in New Zealand is a comparatively new venture which received considerable impetus during the war, when the shortage of manpower caused mechanical cultivation to be used to the utmost in the production of the large quantities of vegetables necessary for the Armed Forces. This article, based on observations at Patumahoe, one of the largest projects in the Services' Vegetable Production Scheme, in three years' operation during the war, discusses the advantages and disadvantages of tractor inter-row cultivation compared with hand cultivation, and describes the cultivation equipment and methods used.**

CULTIVATION of the soil has always been recognised as an important part of successful cropping and from the days of animal- or human-drawn crude ploughs and cruder chopping and hoeing implements to the modern mechanical cultivation equipment the management of the soil has been given close attention. Cultivation is necessary to aerate the soil, conserve soil moisture, control the growth of weeds, and prepare a seed-bed. Inter-row cultivation has always been looked on as an integral part of the successful growing of crops, but unfortunately either through lack of labour or lack of efficient tools this phase of cultivation is often neglected.

It is only on the larger areas that tractor cultivation has a place in market gardening. A market garden large enough to be ploughed and disced by tractor is generally big enough to allow tractor inter-row cultivation. With the cultivation equipment available today it is very easy to make the one tractor do all the work necessary for the crop. The tractor which will bring the land up to the seeding point and in some cases sow the seed requires only the addition of cultivation equipment to carry out the full range of work.

If tractor cultivation is used in market gardens, the rows have to be spaced more widely apart than the normal 12 to 14in., and consequently a smaller quantity per acre will be produced. Normally most small crops such as carrots and onions are grown in rows 12in. apart. At this spacing all inter-row cultivation has to be done by hand, using small hand-operated power tractor wheel hoes and hand

Upper—A 4-row seeder. Lower—A light tractor fitted with tractor inter-row cultivating equipment.

wheel hoes. However, to allow the free movement of equipment on an area being cultivated by tractors it is necessary to increase the width to between 18 and 21in. The yield from crops grown in 21in. rows is about 40 per cent. lower than that from crops grown in 12in. rows. Crops producing 15 to 16 tons an acre off 12in. rows will give about 10 tons off 21in. rows.

### Excellent Opportunity for Test

At the Patumahoe project of the Services' Vegetable Production Scheme, an area of 900 acres of medium to heavy volcanic soil, a full range of tractors and inter-row equipment gave an excellent opportunity to investigate the possibilities of tractor inter-row cultivation of crops grown in 21, 30, and 42in. rows. Furthermore, the areas in crop at Patumahoe were so large and the shortage of labour so acute that every endeavour had to be made to use mechanical cultivation wherever possible.

### Advantages of Tractor Cultivation

The chief advantages of tractor cultivation were found to be:—

1. Saving in time.
2. Saving in labour.
3. Deeper cultivation.
4. More frequent cultivation.

**Saving in Time and Labour:** It was found that a light tractor working in 21in. rows in such crops as carrots, onions, and beetroot cultivated about 1 acre in an hour, but a man with a hand wheel hoe took about 8 hours to cultivate the same area planted in 21in. rows. The cultivation of such crops as cabbage, cauliflower, and potatoes, which are grown in 30in. and 42in. rows, was generally done by a heavier and more highly-powered tractor which could cultivate 1½ acres an hour.

**Deeper Cultivation:** The advantage of deep cultivation is apparent on heavy soils like those at Patumahoe. A wet season packs and consolidates this type of soil to such a degree that ordinary hand methods of cultivation are of little use. The beneficial effect that deep and efficient inter-row cultivation had in crops grown under these conditions was most noticeable.

**More Frequent Cultivation:** Cultivation by tractor can be carried out more frequently because of the rapidity with which a tractor can cultivate large areas, and also because the tractor can be used continuously during rush periods or long hours of work, requiring only a change of drivers. The success of many a crop has depended on whether other jobs could be finished in time to allow attention to be given to it. If shortage of labour and time causes neglect, the crop, if not totally lost, will give such a poor return that in some cases it will not pay for the cost of planting it.

# TRACTOR INTER-ROW CULTIVATION

**One of the most important factors revealed by the work at Patumahoe was the ability to cultivate the crop at the right time. Cultivation of a crop at the seedling stage of weed growth usually produces a total kill of the weeds, but, if left and allowed to develop, weeds cannot be destroyed completely and a dirty crop results.**

## Disadvantages

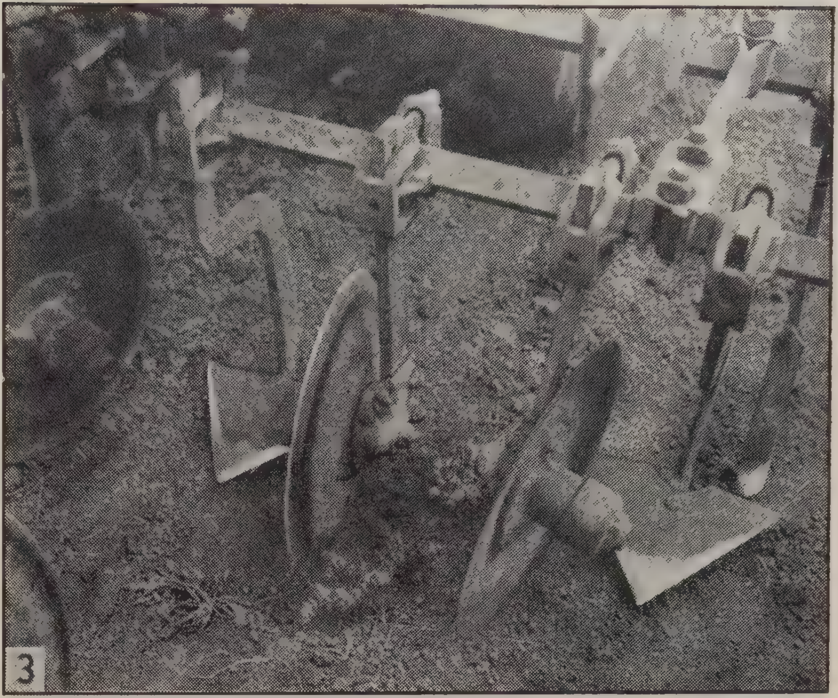
Some of the main disadvantages of mechanical cultivation were found to be:—

1. Soil conditions limit the ability to use the tractor.
2. Smaller tonnage an acre for crops grown only in 21in. rows.
3. Hand working is still necessary in the initial stages of growth.
4. Soil texture must not be turfy or full of fibre.

**Soil Conditions:** The condition of the soil decides whether a tractor can be used or not. At times of high and consistent rainfall it is not possible to put a tractor on the ground, and wheel hoes and horse-drawn cultivators are the only implements that can be used. It was found that perhaps for several weeks the soil conditions were such that it was impossible to use tractors for inter-row cultivation and it was only by the use of the wheel hoe that efficient weed control could be maintained.

**Hand Working:** Under Patumahoe conditions it was found that where labour was available to do the initial inter-row cultivation by hand it was not practicable to use tractors. By the time the crop has germinated and is just showing above the ground the weeds have also germinated and are making more rapid growth than the crop. At this stage wheel hoes can deal more efficiently with the weeds. With these implements it is possible to work closer to the rows of crops than with a tractor and less damage is done to the crops. Generally the first two cultivations are best done with the wheel hoe and then, if soil conditions allow, tractor cultivation can be commenced.

**Soil Texture:** Freshly-broken-up ground out of lea is not suitable for tractor cultivation or for any cultivation, as it is full of fibre and clogs and blocks cultivator points. This applies more to crops grown in narrow rows up to, say, 21in. apart. It is only a temporary difficulty, however, as usually by the second season most of the fibre has disappeared. Under normal conditions new ground would be used for a crop like potatoes, which would give no trouble in this respect. The common practice locally is to take a crop of potatoes off first and then crop with the smaller and finer crops.



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**A close-up view of disc weeders, duckfeet, and deer tongues.**

## Initial Cultivation Must be Well Done

**Practical experience has proved that the initial cultivation must be well done, regardless of whether it is intended to cultivate later by tractor or by hand methods. Faulty cultivation before planting the crop makes it almost impossible to cultivate efficiently later.**

An important aspect of tractor cultivation is the speed at which the tractor is driven. For thorough cultivation the pace must be a secondary consideration; a good crop will be ruined if the tractor is driven too fast through it. Tractor intercultivation requires very careful driving and attention, as a moment of inattention can destroy several yards of a row of seedlings.

A tractor can be used for inter-row cultivation only when the crop has been sown by a tractor. It is not possible to cultivate, say, 4 rows with a tractor unless those rows have been laid down by a gang seeder. Seed put in with a single-row seeder must be cultivated by other methods than a gang cultivator doing 4 rows simultaneously. This is quite obvious to one who has seen crops sown with a single-row seeder. No two rows are the same for spacing and the first row may take a bend to the right in one or two places. The second row may have bends to the left at various places, and consequently each row must be cultivated individually. If seeded in by a 4-row seeder, and the tractor which carried out the seeding does the cultivating and tracks in the same 4 rows, any bend put in by the seeder can be followed by the cultivator and no damage is done to the crop. The method adopted at Patumahoe was to sow all areas of small-seeded crops, such as carrots, turnip, onion, lettuce, and beetroot, by a 4-row seeder attached to a light tractor. This type of seeder when properly adjusted sows the seed very accurately and was found to be much better than any other type of seeder used. The seeding attachment is fitted to the tractor and the power is obtained from the seeder wheels (Fig. 1). It can be seen that a distinct advantage can be obtained by using the same tractor to do both jobs.

## Light Tractors

The tractor shown in Fig. 2 is a light 4-wheeled tractor for cultivating in 21in. rows fine crops such as carrots, onions, lettuce, and other crops with little foliage. This will cultivate 4 rows of crop simultaneously and the depth of cultivation can be regulated from 1 to 4in. Preparatory cultivation of the seed-bed of the crop illustrated in Fig. 2 would have been one or two wheel hoeings. Tractor cultivation could start earlier than this, provided the soil was in a suitable condition to allow a tractor to work on the ground.

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Fig. 3 gives a close-up view of the necessary equipment for the cultivation of 1 row of crop. The discs known as disc weeders are set about 2in. away from the row of seedlings and their main purpose is to cut away from the row and to protect the young seedlings from being smothered by dirt thrown from the other cultivation points. The triangular-shaped equipment attached to the standard on the outside of the disc weeders in Fig. 3 are known as duckfeet. The purpose of this equipment is to cut all weed roots, to stir up and aerate the soil, and to level out the small ridge left by the disc weeder. Also shown is a long narrow cultivator tooth known as a deer tongue. The main purpose of this attachment is to cultivate the small areas missed by the disc weeders and duckfeet. A sufficient number of these cultivators can be attached to the machine to give complete coverage.

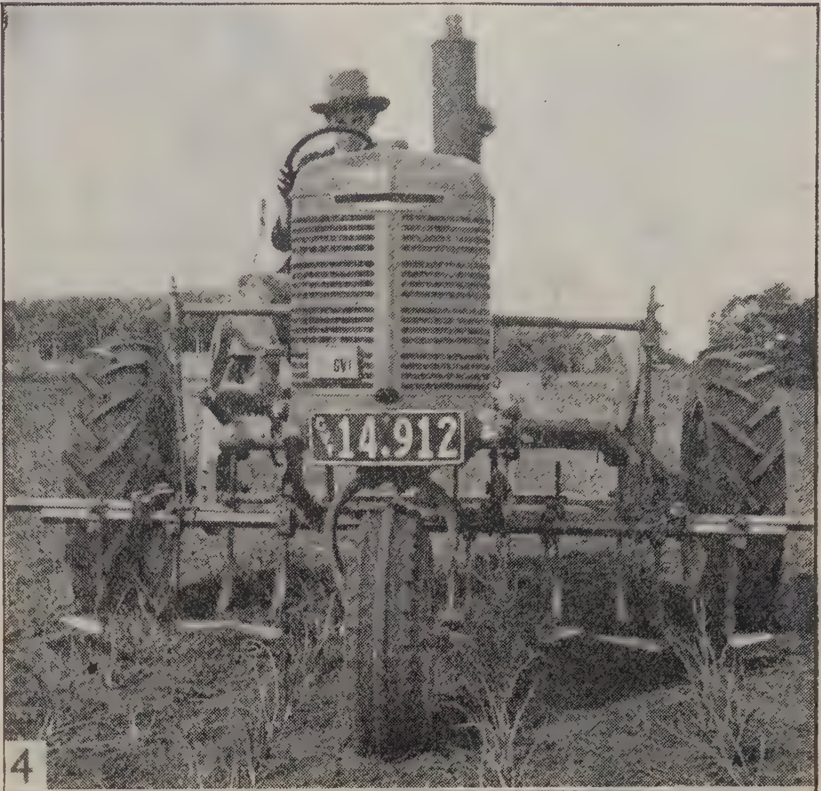
A deer tongue or tongues are fixed to the back standards (known as the rear track sweep) of the cultivator and their purpose is to wipe out the track marks and loosen up the soil packed by the tractor wheels.

A great strain is imposed on the driver while doing this type of work, and it was found that where possible it was advisable to change drivers frequently. This applies particularly to areas the size of Patumahoe, where perhaps 300 to 400 acres were being given similar inter-cultivation treatment.

Under normal conditions the cultivating equipment illustrated in Fig. 2 can cultivate an acre an hour. The easiest way to drive a tractor fitted with cultivation equipment working 4 rows simultaneously is to fix a marker on the tractor at an easy level to the eyes, and to steer the tractor by keeping the marker over one row. If the crop has been put in with a 4-row seeder, no thought need be given to the other rows.

## Knife Weeder

A different type of inter-row cultivator is shown in Fig. 4. This is attached to a light, 3-wheeled tractor, but could quite easily be put on to a 4-wheeled machine similar to that shown in Fig. 2. This equipment is primarily used for weed destruction, although it gives a certain benefit by shallow cultivation. Here again 4 rows can be cultivated at one time. This equipment effectively replaces the wheel hoe on crops past the small seedling stage, but it cannot be used as efficiently as wheel hoes on seedling crops in the very young stage. It is, however, very effective in crops from the stage shown in Fig. 4 to maturity. The chief advantage of this equipment is that once it is set all its cultivation will be uniform, which is not often the result if wheel hoeing is done indifferently.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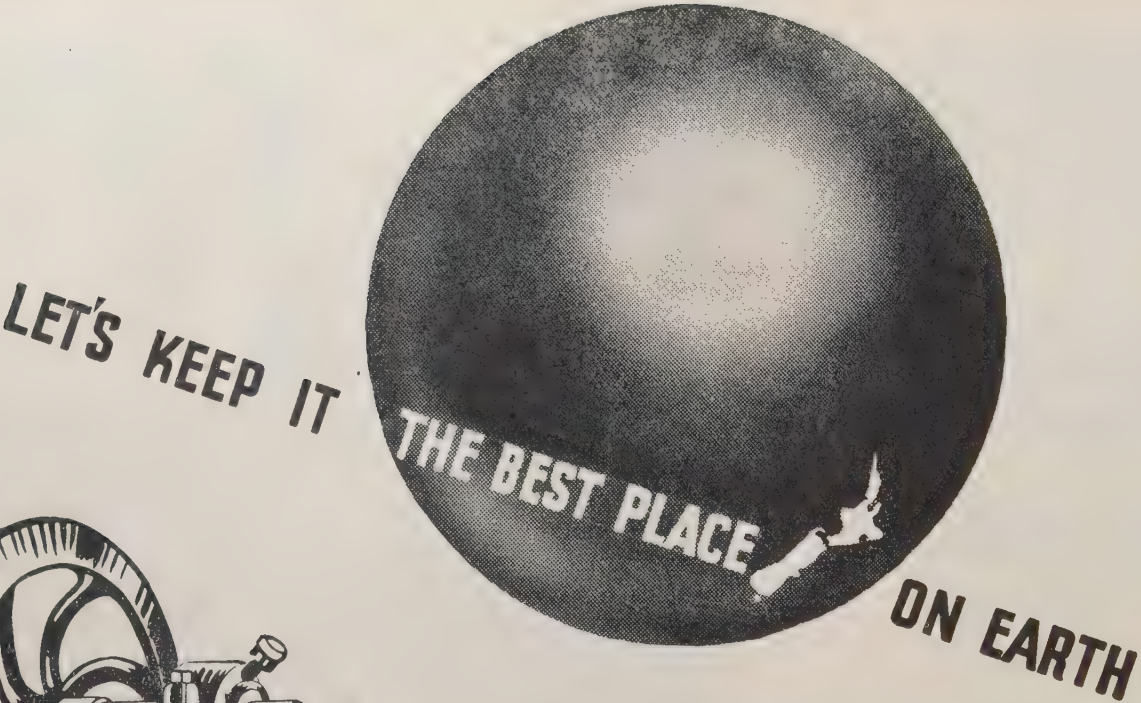
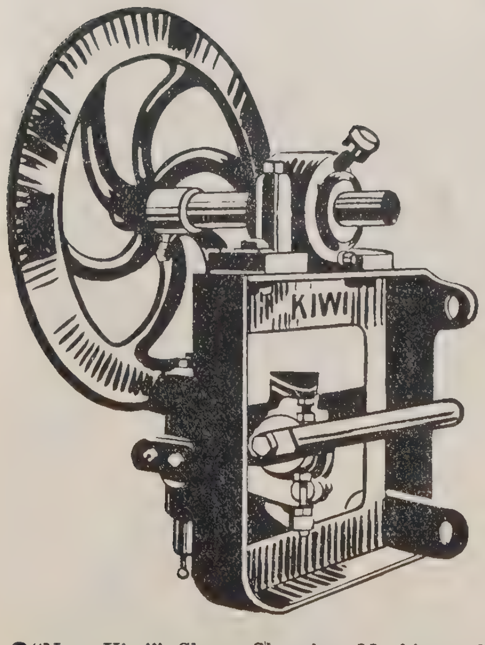
Upper—Front view of a light tractor equipped with knife weeders. Lower—Filling one of the two fertiliser bins attached to the tractor.





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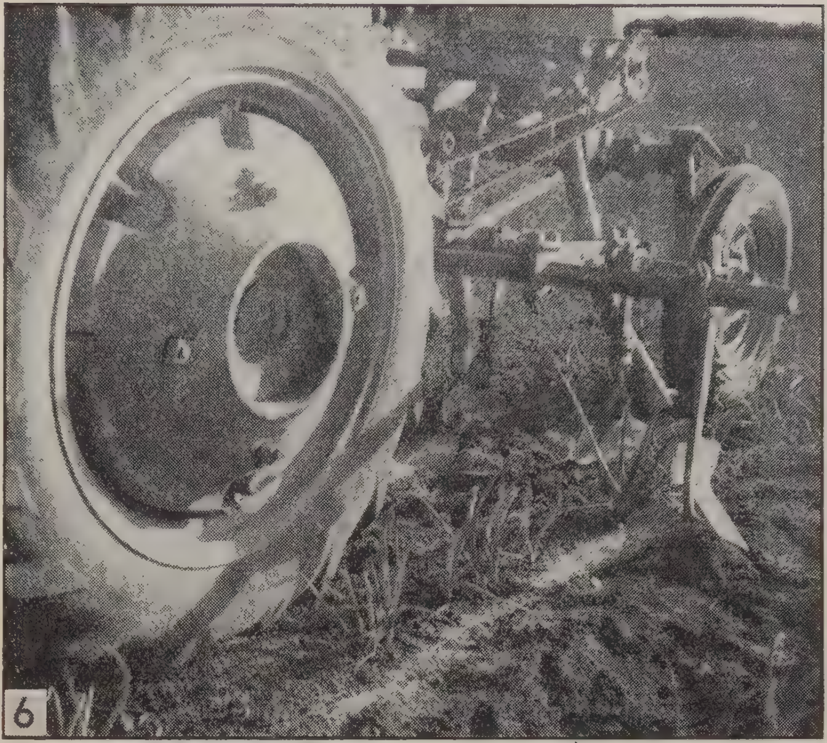
# TRACTOR INTER-ROW CULTIVATION

These cultivating attachments are known as knife weeders, and are similar to those used on wheel hoes. When working, the knives are 1 to 2in. under the surface of the soil and cut all weed roots and stir and aerate the soil. They can be set at any distance from the row of crop and are also set to overlap, thus covering all the row. It will be noticed that deer tongues have also been fitted and the purpose of these is to drag weeds after they have been cut and so prevent any chance of their re-establishing. This applies more particularly during wet weather when soil conditions are damp and conducive to root growth. The deer tongues also level off any ridge or cut left by the weeder. The chief advantage of this type of cultivator is that it can very efficiently replace the wheel hoe at this stage of the crop's growth. As with wheel hoes, however, the soil must be dry and friable and contain only a small percentage of fibre for the best results. The slope given to the leading edge of these weeders tends to let fibre slide off and lessens the chances of the knife choking.

Although they are not shown attached to the equipment in the illustration, rear track sweeps are an advantage in loosening up and wiping out the tracks left by the tractor.



Fertiliser being laid along the side of a row.

## Applying Fertiliser

For intensive cropping, particularly for such crops as lettuce, radish, soft turnip, and similar crops where quick growth is needed, or for any crop backward in growth, a very quick and efficient method of applying fertiliser is by a combination unit of cultivation and fertiliser equipment.

In Fig. 2 attached to the side of the tractor is one of the brackets which hold a fertiliser bin. Fig. 5 shows a fertiliser bin attached to one side of the tractor and another bin is attached to the opposite side. These bins have a capacity of 1cwt. and a sowing capacity of 1 to 20cwt. an acre according to the ratio of the drive of the bin. The quantity sown is regulated by the small lever and ratchet seen on the lower portion of the bin and by the drive ratio on to the bin. The mechanism of the bin is star-fed and is driven by the tractor. Fig. 2 shows on the inner side of the back wheel a nest of cogs which operates the bin. The fertiliser is fed down through two flexible tubes in each bin. Fig. 6 shows one band of fertiliser being placed on the side of the row. By using one tube to each row, 4 rows can be done at once. The fertiliser is worked well through the topsoil by the knife weeders. If two bands of fertilser are required on each row, only two rows can be topdressed. Any cultivation gear will do to work the fertiliser into the topsoil. If the machine and equipment are set up correctly, even fertiliser which would severely burn or damage the crop can be laid in perfect safety at any distance from the row—a far more satisfactory method than applications made by hand.

Similar bins can be used on larger tractors to sidedress such crops as cabbage, cauliflower, tomatoes, or any field crop.

## Heavier Equipment

A very efficient type of cultivator was used on the more mature crops. Although this is a much larger and heavier type than those used on the younger and smaller crops, it was found from experience that it can work in crops at the same stage as lighter tractors. This can be seen from Fig. 7, which shows the assembled cultivation unit. Although lighter tractors can be put through rows several inches narrower than 21in., this tractor could not work in rows of less width than 20in. For its size the machine is remarkably manageable and it was found that some drivers preferred this unit for inter-row work. Normally this type of tractor is fitted with a twin steel front assembly which makes it impossible to use for any inter-row cultivation work. As can be seen in Fig. 7 the entire front stem axle and wheels have been taken off and a front fork made, and to this has been fitted an ordinary 16in. rim and tyre. This rubber front, which is the secret of the unit's manoeuvrability, has proved a great success and has allowed the tractor to be put into fine intercultivation work.

The cultivator can work to a greater depth than any previous unit described, and it cultivates 4 rows at once. The cultivation units shown in Fig. 7 are known as chisel teeth because of the pattern on which they are made. The overall length of one tooth is 24in. Running from the point up to a height of 6 to 7in. is a knife edge which allows easy penetration into the soil but which does not collect fibre as a blunter and thicker blade would. The

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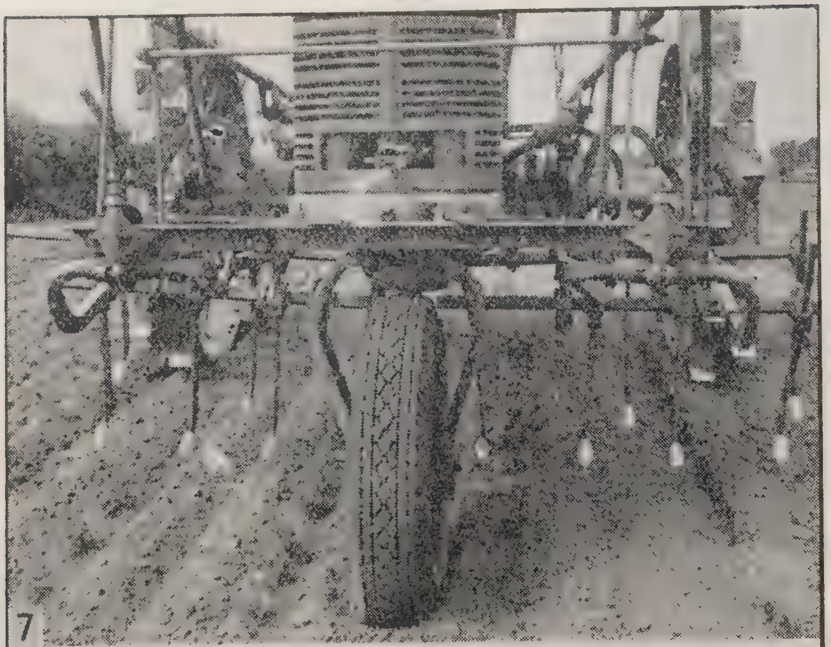
## Radio Broadcasts

RADIO talks to farmers will be given from Station 1YA, Auckland, at 7.15 p.m., on the following dates:—

March 17—"The Work of the Fields Division in Post-war Farming," by J. W. Woodcock, Assistant Director of the Fields Division, Wellington.

March 24—Young Farmers' Clubs session, by S. G. V. Avery, Dominion President of the Young Farmers' Clubs Federation.

March 31—"Kikuyu Grass," by E. H. Arnold, Instructor in Agriculture, Whangarei.



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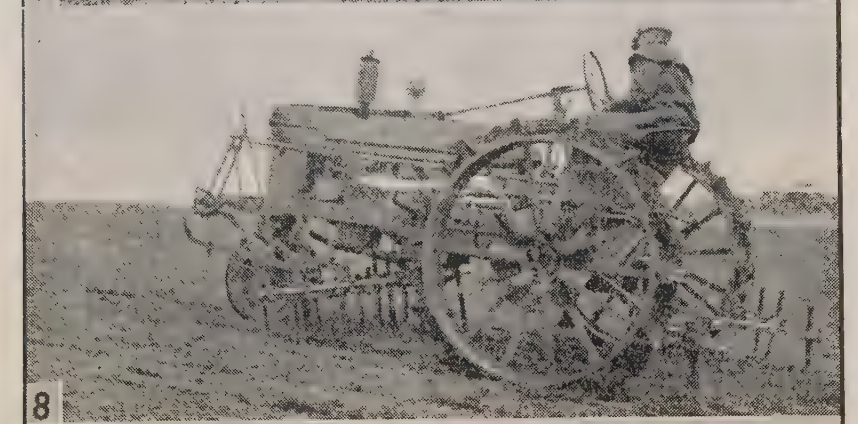

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Upper—A heavy tractor fitted with inter-row cultivation equipment. Middle—The chisel teeth cultivators are set well forward on the tractor. Lower—A cultivator and moulder working in a cabbage crop.

chisel teeth tend to cultivate under the surface of the soil and do not throw up a large amount of soil when the tractor is driven at a moderate speed —a big advantage when small, fine crops are being cultivated. The point of the chisel tooth is replaceable when worn out or damaged and is merely riveted on to the standard. Fig. 8 shows how the front assembly of this cultivator is set well forward on the tractor. The advantages of this are: First, the unit is easily seen by the driver; secondly, there is better balance on the tractor; and thirdly, the cultivator is more easily controlled by being close to the front wheel The chisel teeth on the back gang loosen up the soil and wipe out the wheel marks. The arrangement of the teeth is generally 3 chisel teeth between each row of crop. It is not practicable to set these teeth too close to the row of crop, 3in. being close enough. In Fig. 8 the cultivator is shown working at a depth of 6in. and it will be seen that it does not bring up large lumps or blocks of soil. As the crops grow the speed can be increased and the small amount of earth thrown out by the teeth at the higher speed is an advantage at an advanced stage of growth, as it tends to form a small mould on each side of the row which smothers any weed growth in the row and protects the plant generally. This equipment is operated by a hydraulic pump in the tractor and a slight pull on a lever raises and lowers the equipment. This is very much easier to handle than hand-operated levers which require a good deal of strength to raise and lower equipment of this nature. The hydraulic lift by bringing the cultivators back to the exact setting each time it is raised and lowered at the ends of the rows ensures cultivation of an even depth throughout the crop. Hand-operated cultivators generally do not maintain an even depth because the driver is likely to vary the settings of the hand lift. This unit can cover 1 to 1½ acres an hour, depending on the size of the crop, and can cultivate up to 2 acres an hour in maturing crops.

## Cultivating Crops with Heavier Foliage

Larger crops such as cabbage, cauliflower, dwarf beans, peas, and potatoes, which were generally grown in 30in. rows, required frequent and deep cultivation. The practice where possible at Patumahoe was to put one unit just ahead of another and to complete two jobs at once as shown in Fig. 9.

The cabbage cultivators and moulders shown in Fig. 9 are on separate machines. This, of course, was necessary on account of the large areas under production. At times there were 200 acres in cabbage and cauliflower, all needing the same cultivation. For the average farmer using one tractor to carry out all the work it is not a big job to change over from cultivators to moulders or vice versa, or to drop off the cultivation gear altogether. Makers of this type of equipment always bear this in mind and quickly-attached devices are features of most cultivation equipment.

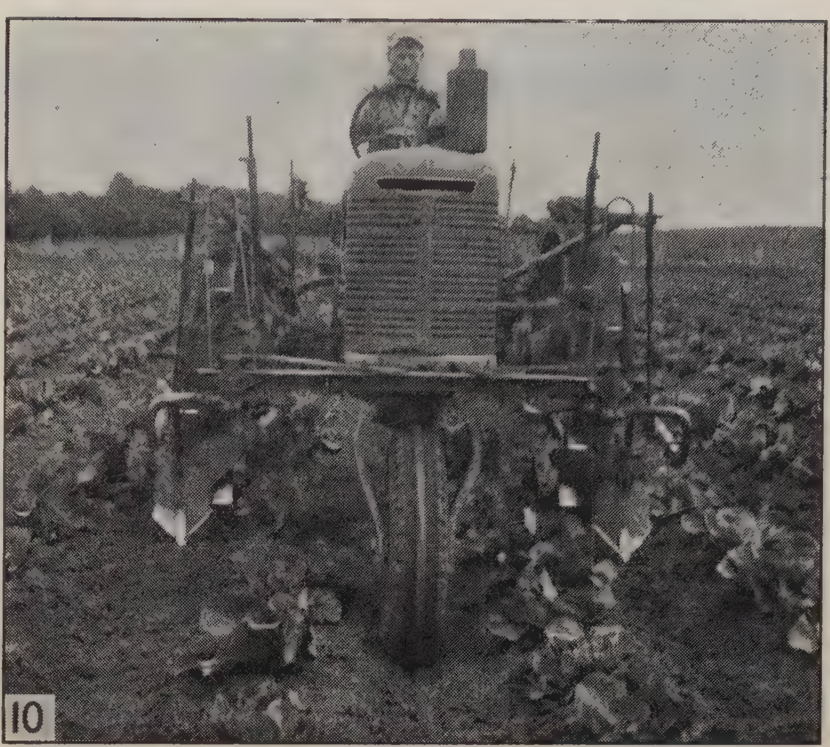
The front machine in Fig. 9 is the cultivating unit, the rear machine being the moulding unit. This type of cultivator and similar types are fitted with tool bars to which can be attached any particular type of cultivator. Chisel teeth were used and generally three were sufficient to cultivate thoroughly between the rows of crop. This cultivator will cultivate only 2 rows of crop and will follow the 2 rows put in by the 2-row ridger.

It is also used for sowing the fertiliser required for cabbage and, in some cases, cauliflower crops. The rate of sowing is 20 to 25cwt. to the acre and the manure is placed under a ridge of earth. This is best done, if possible, a week or two before planting out. Planting out is generally done immediately following rain, when soil conditions are moist.

### Efficient System of Planting

The system of planting developed in the district has proved very efficient and trained workers can plant out very large areas in a very short time. Plants are generally grown next to the area to be planted and when needed are pulled and placed in cases and laid between the ridges. Workers are paired off, one "planting" and one "dropping." The dropper holds an armful of plants and drops one at about the right spot along the row. The planter follows and with a trowel makes a hole in the ground, places the plant in it, and with one foot firms the ground around the plant, the whole planting being done in one motion. A team of 8 to 10 can plant 2 acres or more a day. The two rows thrown up by the ridger are the two rows cultivated together by the cultivator.

On a cultivator of the type shown in Fig. 9 there are 9 chisel teeth operating between the 4 rows and 6 more are attached to the back gang to wipe out wheel tracks. The 15 chisel teeth, all in the soil to the depth of several inches, give complete cultivation for 2 rows. On heavy soils considerable power is needed to cultivate efficiently and to prevent the cultivator being too heavy a load on the tractor.



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A tractor fitted with set of moulders.

The general practice in the cultivation of the cabbage and cauliflower crop was to put the tractor into the crop 10 to 14 days after planting out. This gave the plants a chance to become established and, provided the chisel teeth were not set too close to the row and the tractor was driven slowly, no damage was done to the young plant. Generally planting out was done after rain and as a result the ground between the rows tended to pack and consolidate from the passage of people doing the planting out. These crops required deep cultivation for best results and it was found that cultivation units such as the one shown were very efficient. The average area covered by one of these units in an hour was 1½ acres.

Cropping methods in the Patumahoe and Pukekohe districts require cabbage and cauliflower crops to be properly moulded like potato crops. The chief advantages of this are: First, it protects the plants from the high winds experienced in the districts; secondly, it smothers weeds close to the plants; and thirdly, it helps to raise the plant up, particularly during the winter and early spring, and keep the roots warm and dry.

Fig. 10 shows a set of moulders fitted to a cultivation unit similar to other units shown in this article. The moulders are composed of three parts, the moulder, the point, and the wings. The point is replaceable and this is an advantage in stony or timbered country where snags may be encountered. As a further safeguard a safety device called a "spring trip" is incorporated in the moulders; on striking any solid obstruction it detaches from the standard and flies back. Fig. 11 shows the spring on the moulder which operates the safety device.

The moulder moulds only 2 rows. The moulders attached to the front of the unit have only one wing, which throws the soil inward. The back moulder has two wings and these throw soil to either side and complete the moulding of the two rows. Normally moulding is not carried out till the plants are half matured, and here again the speed of the tractor is important. The first time the moulders are put through the crop a slow speed is necessary, because the thrown soil would smother a part of the crop if the speed were too fast. On the second moulding the tractor can be driven at a higher speed, which will cause the soil to be well thrown around the plants, smothering the weeds and giving the plants adequate support. Fig. 9 shows the moulders going through the crop for the first time.

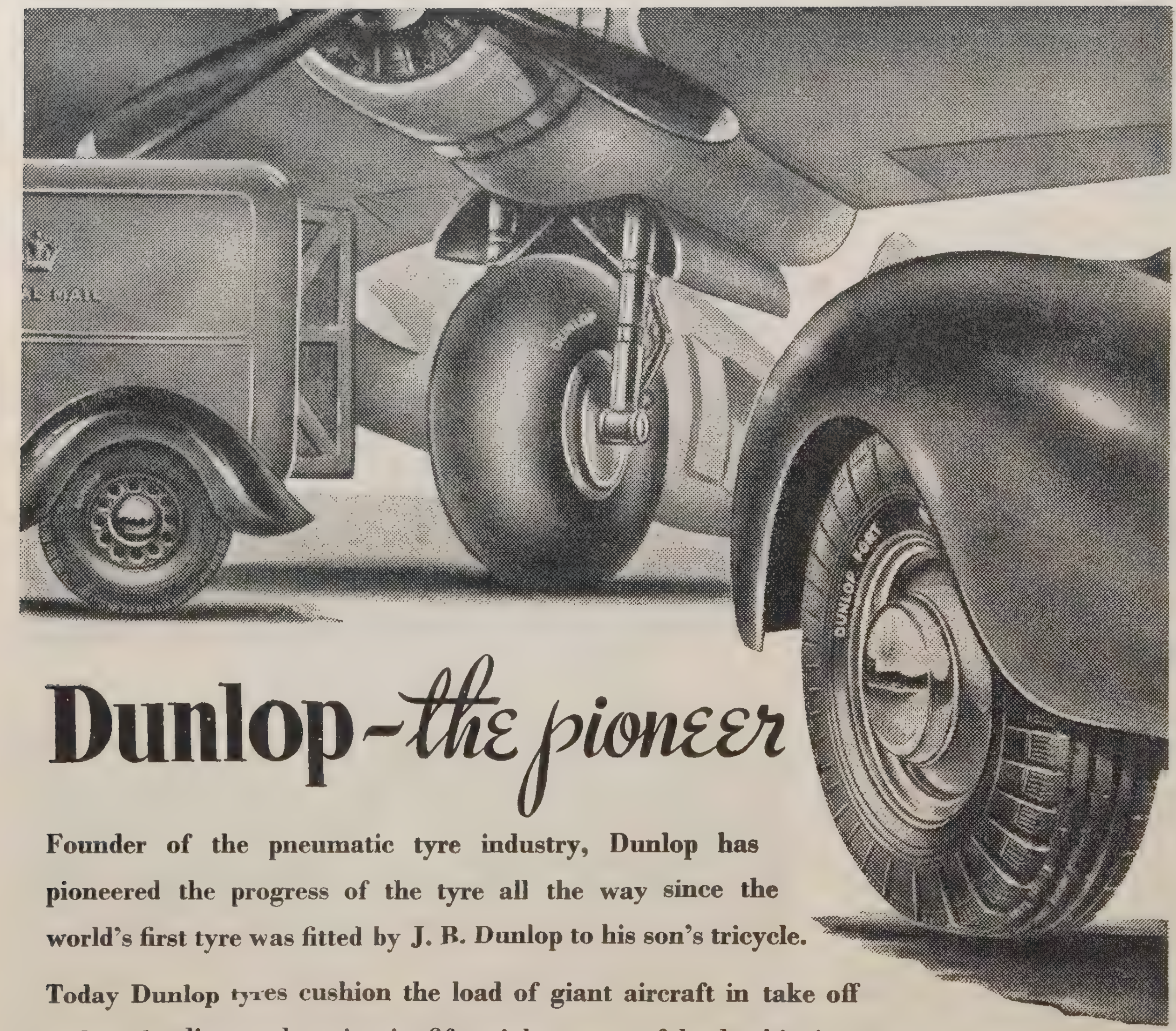
**Moulders will not work successfully unless the soil between the rows is loose. The crop must be**

## Pig Broadcasts

UNDER the auspices of District Pig Councils broadcasts will be delivered in March as follows:—

Auckland—1YA, on March 19, at 7.15 p.m., "Equipment that Makes Pig Keeping Easy," by H. E. Clark, Supervisor, Auckland District Pig Council.

Wellington—2YA, on March 18, at 7.15 p.m., "Origin and History of Breeds in Use in New Zealand," by I. Owtram, Supervisor, Taranaki District Pig Council.



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**thoroughly cultivated just before moulding to ensure a plentiful supply of loose, friable soil.**

In Fig. 11 the land shown has just been broken out of a peaty swamp and the crop of cabbage is the first crop grown on it. As fine inter-row cultivation with knife weeders, duck-feet, and similar cultivation equipment cannot be done efficiently if the soil is full of fibre and rubbish, great difficulty would be experienced in working this land.

## Cultivation of Beans and Tomatoes

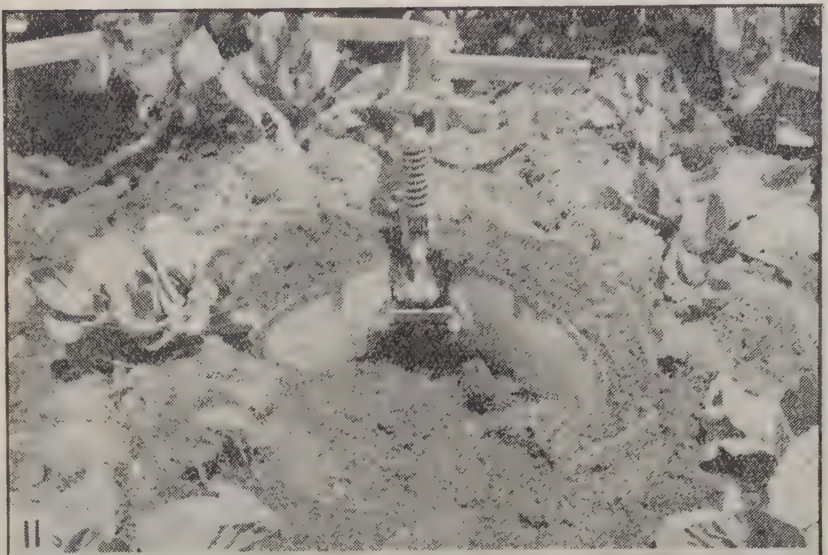
Large areas of both beans and tomatoes were grown at Patumahoe and tractor inter-row cultivation played an important part in the maintenance of these crops. Both crops were grown in 42in. rows to allow ample room for harvesting, and the tomatoes were sprayed with a tractor power spray.

It was not possible to stake the beans, as the areas were too large. However, it was found that, by sowing in 42in. rows, and by occasionally pruning back the runners with a cabbage knife, a bushy plant could be grown, and the plants supported each other, forming a low bushy hedge. Excellent returns were obtained from the beans grown in this manner. Both tomatoes and beans respond to regular and efficient shallow inter-row cultivation and the tractors were kept in the crops right up to harvesting if necessary.

For the cultivation of these crops the units shown in Fig. 12 were used. Only two rows of crops could be cultivated simultaneously. Fig. 13 shows the front portion of the cultivation equipment. The triangular-shaped cultivation units are known as spear heads and are capable of deep penetration of the soil if it is in a loose and free condition. Deer tongue cultivators can also be used very efficiently on this type of cultivation unit. As the crop grows the distance between the two spear heads can be widened to suit the crop by the lever and ratchet above the spear heads. Fig. 14 shows the sweeps, which are shallow cultivators to loosen up and level out the soil behind the spear heads. Four spear heads and 7 sweeps complete the unit. Two spear heads work down each side of the row of crop and 2 sweeps cultivate behind the wheels and wipe out the marks left by the tractor. The remaining 3 sweeps cultivate between the 2 rows and wipe out the track left by the front wheel. One and a half to 2 acres an hour can be cultivated by these units, depending on the size of the crop and the distance the cultivation points are away from the row. Fig. 15 shows the depth of cultivation and the distance the spear heads are from the row.

Periodical side dressings of fertiliser were necessary for the tomato crops

## TRACTOR INTER-ROW CULTIVATION



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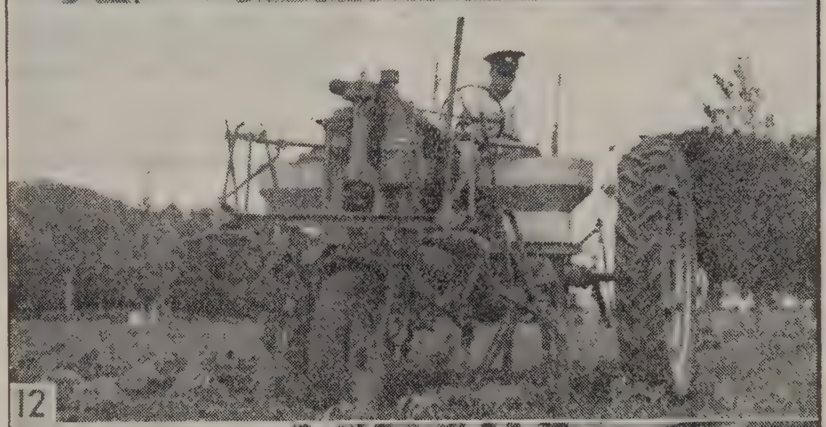

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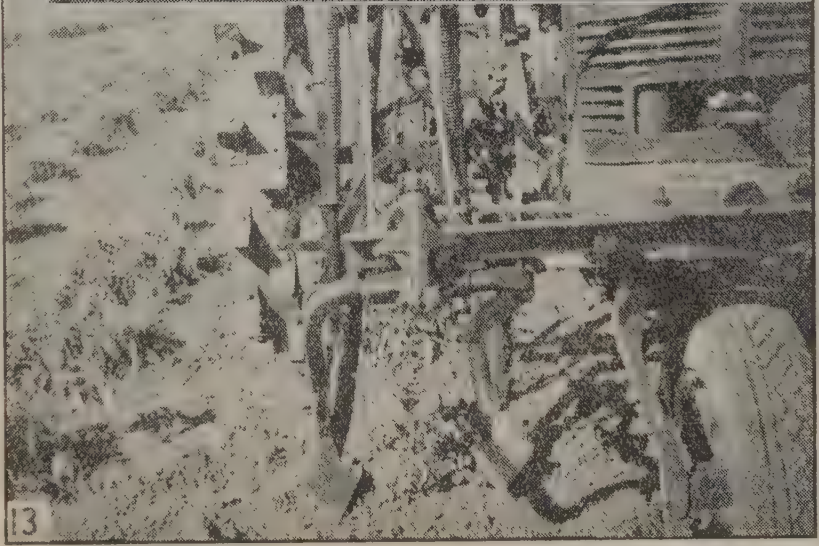

13

Upper—A rear moulder, showing the spring of the safety device. The land has just been broken out of peaty swamp and therefore contains much fibre. Middle—A tractor fitted with cultivation equipment for beans and tomatoes. Note the fertiliser bins on the sides. Lower—Front view of the spear-head cultivator, showing the spear heads.

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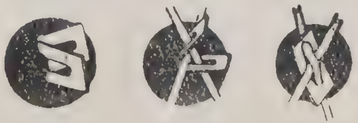

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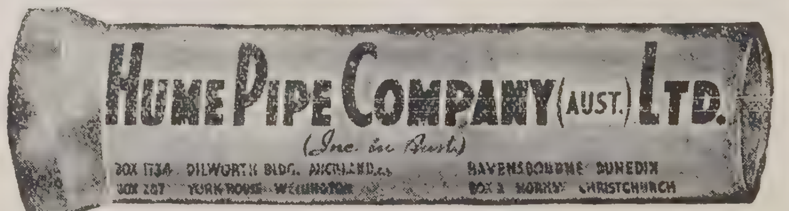
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and these were applied by a unit similar to that shown in Fig. 12. This unit worked in the same way as the one described earlier in the article. From each bin two tubes led down to the back of the spear heads, and the fertiliser was applied to the soil immediately behind the spear heads. The sweeps on the rear of the tractor mixed and distributed the fertiliser thoroughly through the topsoil. This method of applying fertiliser was found more economic and satisfactory than hand methods, and quantities of up to 1 ton an acre could be applied. All the initial marking out and application of fertiliser for the tomato crop was done with these machines, the spear heads being set 14in. apart and the sweeps not being used at all. The fertiliser was applied to the soil at the back of the spear head and the two spear heads formed a small low ridge of earth which was sufficient to enable the planter to set out the young tomato plant. No damage resulted to the plants from fertiliser burn, as the fertiliser was placed 7in. away from the centre of the ridge formed.

For best results only a small application of fertiliser was found necessary when setting out the plants and, although the total quantity given to the crop ranged from 15 to 30cwt. an acre, this was given as several side dressings during the crops' growth.

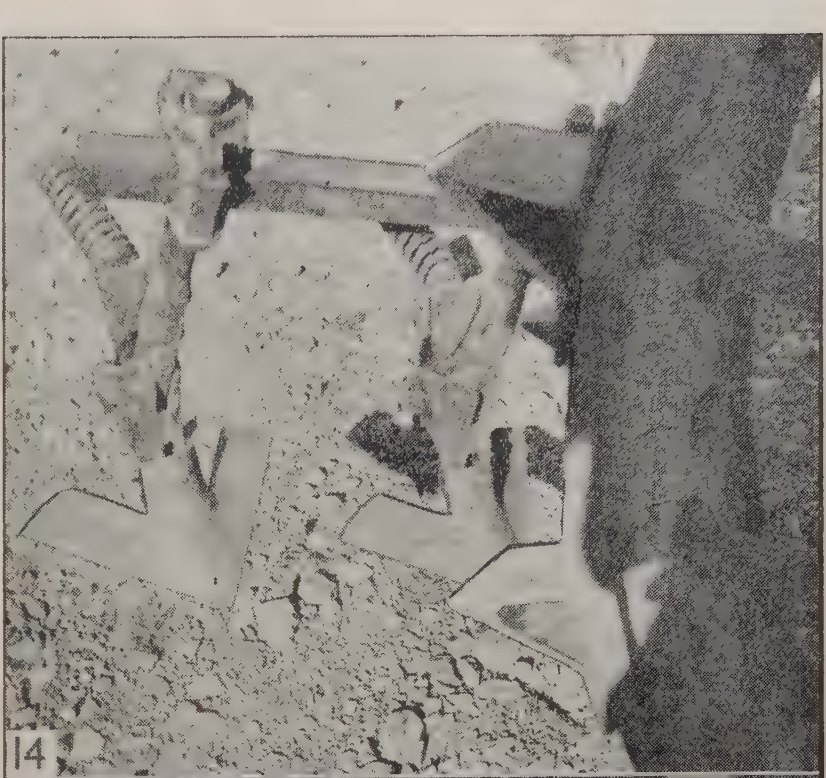
It must be clearly understood that the cultivation methods described in this article were used only in vegetable crops, but all the cultivation equipment could be put into almost any field crop. A noticeable feature in all the illustrations is the absence of weed growth, which has resulted from sound cultivation practices up to the seedling stage and subsequent inter-row cultivation. It may be concluded from the illustrations that this district is free from weeds, but Fig. 16 shows clearly the weed growth in a crop not cultivated efficiently and eventually abandoned in this district. One attempt had been made to wheel hoe this crop and the few visible rows of onions showing are the result of that wheel hoeing.

### Improvements on Existing Methods

Any method which reduces the width of the crop row required for tractor cultivation should be considered and one way of doing this is shown in Fig. 17.

The wheel shown is known as the "tip-toe" wheel and has proved most satisfactory. With the knowledge gained from experience at Patumahoe it may be possible to reduce the row width which can be intercultivated from 21 to 15in. This would be the ideal, as very little loss of production would result from crops grown in this row width.

A still greater degree of mechanisation for cultivating farm crops will be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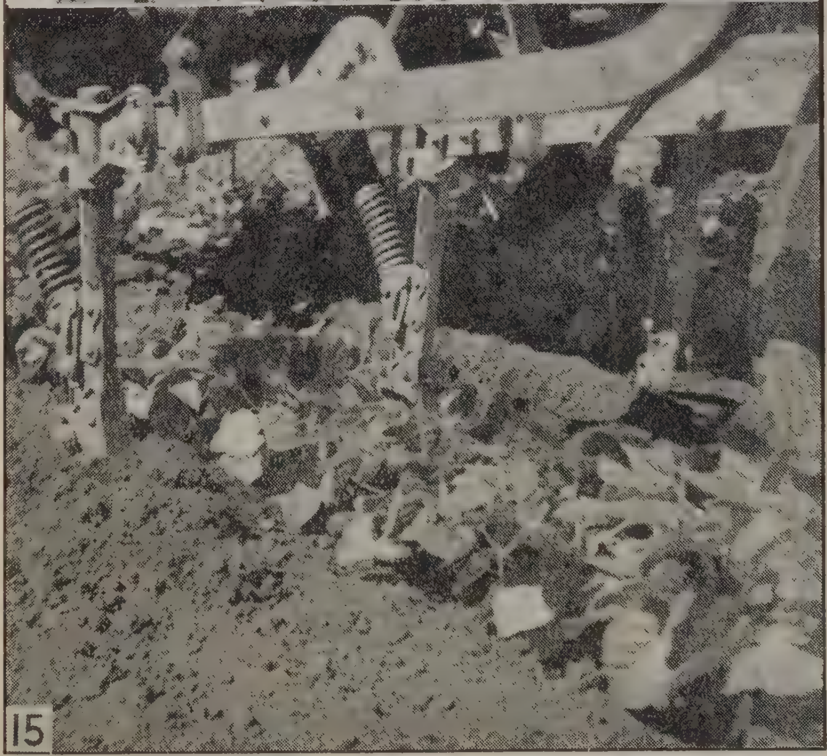
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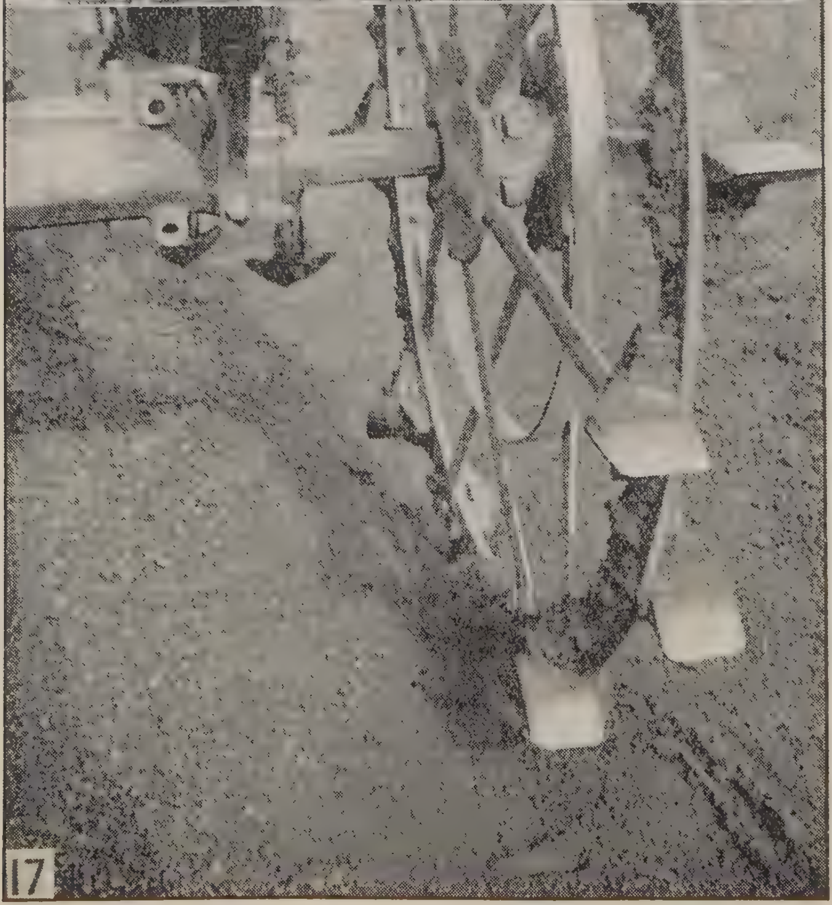
Upper—Sweeps at the rear of the tractor to loosen up and level out the soil behind the spear-head cultivator. Lower—Spear heads working in a bean crop, showing the depth of cultivation and the distance from the row.



possible when further discoveries are made in methods of weed control. Such a discovery has meant that in the growing of a carrot crop little or no tedious and costly hand labour is now required. Provided the carrot crop has been seeded in at a rate requiring little or no thinning, ordinary power kerosene at the rate of about 30 to 40 gallons to the acre sprayed over the crop when in its second or third fern leaf stage will kill all weeds. If soil conditions allow the use of a tractor, the crop can be cultivated by machinery from seeding right up to harvest.

## Conclusion

The success of tractor cultivation depends largely on the care with which the tractor is handled, but it should not be very difficult for the average farmer to train a man to operate a tractor efficiently in this work. The work at Patumahoe required not one man but as many as 15 to 20 all capable of using tractors on inter-row cultivation. To find and train men presented many difficulties. The extreme shortage of manpower during this period meant utilising whatever labour was available and required high-pressure methods and concentrated effort to train the men to use tractors and equipment proficiently.

**Upper left—An onion crop over-run with weeds through inefficient cultivation.**

**Lower left—A "tip-toe" wheel, which requires less space for working through a row and thus allows the row width to be reduced.**

The experience gained has shown that a wider use of tractor inter-row cultivation for farm crops of New Zealand is well worth consideration.

The cultivation of the large areas of vegetables needed for the Armed Forces was possible only by the use of mechanical equipment and results at Patumahoe have proved that it would be a simple matter to use this form of cultivation for all farm crops; without doubt this would be the means of increasing production.

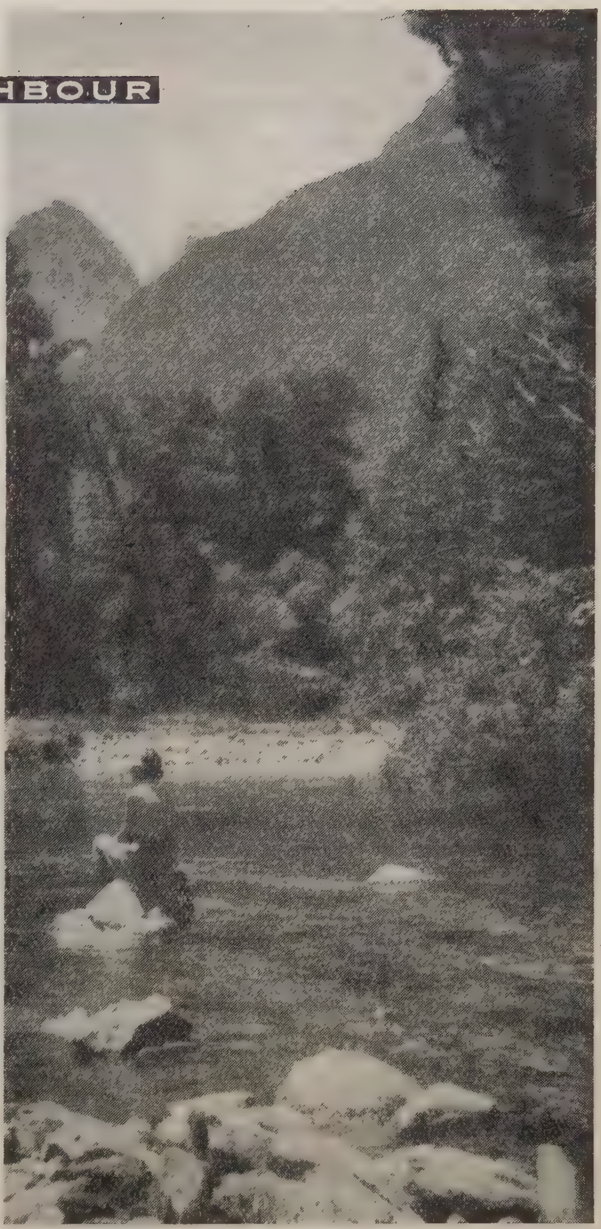
## Acknowledgment

Thanks are expressed to Mr. E. Copsey, Auckland, for his help in the preparation of this article. His knowledge and application of tractor inter-row cultivation made it possible to mechanise successfully the large areas in the Auckland Province which were utilised for the production of vegetables for the Armed Forces during the war.

All photographs in this article, except Figs. 13, 14, and 16, are by Sparrow Industrial Pictures Ltd.

THE GOOD NEIGHBOUR

# "Smooth Runs the Water..."



*A FAVOURITE view of mine, and one the appeal of which long familiarity has in no wise lessened, is from a vantage point where two roads meet a few hundred yards from my home. On my frequent journeys down the hill I seldom have time for more than a hasty glance in that direction, the steepness of the gradient and vagaries of the local transport service not being conducive to leisurely strolling. But coming back it is different altogether. Though I am fully able to accomplish the ascent at a reasonable pace without halting for breath, nevertheless I find it very pleasant to pause on the crest just above the junction of the roads, where the wind is clover-sweet and cool and tall hills shoulder the sky, and through the green mist of trees glimpse "the half-moon gleam of water" far below.*

*If you continue along the road as it climbs higher and higher among the hills, you will have the stream for company only a small portion of the route, for it is shy and retiring, withdrawing from human haunts as much as possible in preference for remote rock-caverns and lonely ravines, and oft-time frequenting the dim labyrinths of ferny gullies. Yet always its voice can be heard, now soft and subdued as the sough of the wind in the pines, now rising like the roar and surge of the sea. And just when you are beginning to despair of ever catching sight of your elusive companion again, you round a narrow loop of the road and suddenly the music of a hidden waterfall sounds close at hand. You approach the lichened timbers of a little bridge and presto! there is the stream dancing and laughing up at you before it goes scurrying over the stones. It is a delightful spot in which to dream for an hour —or a day.*

*Should you wish to become more closely acquainted with the stream, however, you will do best to forsake the highway for the tiny track which starts at the foot of the cliffs where they meet the outer valley. There it is comparatively easy to trace the water's course through breast-high thickets. In places the current is quite swift as it races over natural weirs of boulders, but there are shallows, too, and wide, placid pools where children swim in summer. (As Shakespeare says: "Smooth runs the water where the brook is deep.") If you are adventurous enough and prepared to wade part of the way where you cannot force a passage through the tangled overgrowth, you can go blackberrying upstream in season, for the bushes yielding the biggest and sweetest berries cascade down the banks in wild confusion. The ideal time for such expeditions is the early morning "when the day breaks in enchantment*

*And the careless sky is filled with little twisted clouds.*
*The river stirs . . .*
*The scented water throws its fragrance to the waiting gorse,*
*And the haloed willows hold a haunting loveliness."*

*Follow the stream far enough and you will come upon that lovely, secluded dell whose beauty inspired me to describe it in verse when I first discovered it some four or five years ago:*

*Beneath this steep rock-face*
*Which only knows the passive touch of lichens'*
*Chill-veined, trembling fingers, and never feels*
*The sunlight's warm embrace*

*I rest, peace girding me.*
*Across the world men haste to war—and death!*
*Yet here time slowly moves, like some vast bird*
*Homing through eternity.*

*When you are in meditative mood and disinclined for strenuous exertion you will enjoy a walk through the green paddocks where the stream fans out over shining flats of shingle to join the river. There was a blue haze of heat on the hills today as I sat in the willows' shade and watched the river. "The light reeled and glinted . . . it made a thousand silver daggers . . . it spun and eddied and became a cluster of pointed petalled flowers . . . it spread and simmered, lengthening from bank to bank till it was a veil of shimmering gauze. And then it was stars. And suddenly the words were there in my mind—*

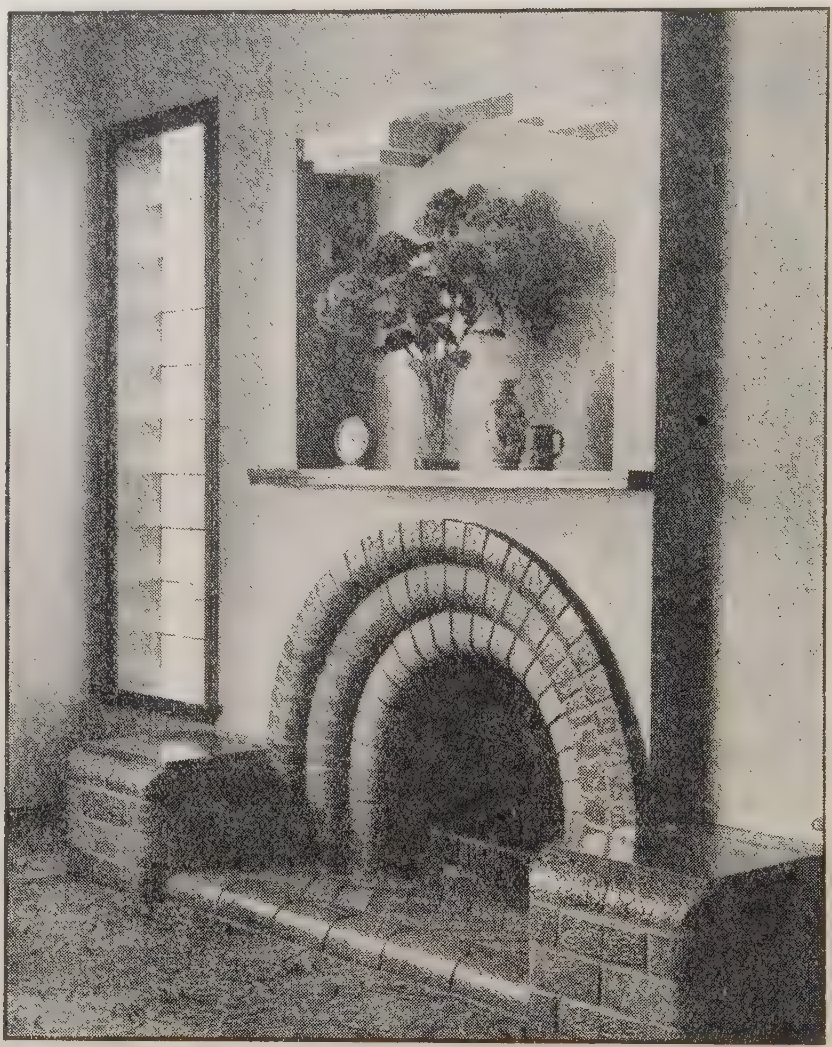
*' . . . in broad daylight*
*Streams full of stars like skies at night.'*

*And I knew that Davies, the poet, had watched it too, the magic that danced and flickered and died. There was the drowsing water and the drench of light . . . beauty and brilliancy for all eyes to see . . . a river and a noonday sun."*

Mary

# FINISHING TOUCHES TO THE HOME

*By* NORMA K. METSON,
*Rural Sociologist, Wellington.*



HAVE you ever seen a woman walking down the street wearing a smart black tailored suit and white blouse, with a hat mainly pink feathers and net, a furry deerskin purse, green knitted gloves, grey lisle stockings, and tennis shoes? I hope not, and it is very unlikely, because women realise that matching accessories are essential to a smart appearance and make all the difference to a more or less standard costume or frock.

BUT have you ever walked into a room where there were a yellow beaded lampshade, an aspidistra, china ornaments ranging from a Dresden shepherdess to a large pink pottery rabbit, brass, china and crystal vases, a copper wood box, a tapestry fire-screen, chromium and plastic ashtrays, a clock held aloft by a marble statuette, an Olde Englishe reading lamp, and assorted pictures and photographs? Again, I hope not, but it must be admitted that the chance of doing so is considerably greater than that of seeing the lady described above. And yet the same principles apply. Matching accessories are just as important in rooms as in clothes.

## Usefulness or Ornament

**Some accessories are included in a room because they are useful and necessary—ashtrays and clocks for example; vases and mirrors may be mainly for use or for ornament; pictures, sculpture, and "ornaments" are not useful, but they are none the less important in the decorative scheme. Whatever place they are to occupy, these "extras" should be chosen in accordance with the basic art principles. They should be well designed, and in harmony with each other and the general scheme of the room.**

A difficulty is that in many homes accessories are not chosen but just arrive—as wedding, birthday, or Christmas presents, as the products of handcrafts and hobbies, as prizes won in competitions. That is bad if it means continuous accumulation until the mantelpiece appears in imminent danger of collapse from overloading, books cannot be reached without the removal of an ornamental barricade, and it is impossible to play the piano without a tinkling accompaniment of vibrating vases. But it can be a good thing if it means that these small objects are sorted and grouped, so that every now and then, when rooms are beginning to look dull and uninteresting, one set can be packed away and a new selection brought out.

A distinction must be made, too, between masses of miscellaneous objects and collections which are really important to their owner. Some people are fortunate enough to have beautiful china or other heirlooms and curios, or they may have made a hobby of gathering carved boxes or miniature animals. Such precious things may be the centre of interest in a room and deserve special shelves or a glass-fronted cabinet for their display, as much of the effect is lost if they are scattered about the room.

## Choice of Accessories

**Books** are important for their contents rather than their appearance, but different sizes and bindings may make interesting patterns. Do not have shelves too deep, or the books cannot be seen. If book-ends are used, they must be solid enough to keep the books in place; have them of wood or metal rather than a breakable material, as they are sure to be dropped or knocked over sooner or later.

**Clocks:** A dial and hands that make the time perfectly plain, simple lines, and an absence of ornate decoration are all that are required of a clock. Those essentials may be found in many well-designed types, ranging from the conventional wooden mantelpiece models to the latest in metal and plastic. A clock should be placed where it is easily visible from all parts of the room, but that does not necessarily mean the centre of the mantelpiece.

**Ashtrays:** The rule for most households is to have plenty of ashtrays, to place them within reach of all chairs, and to choose types which are easily kept clean. Moulded plastic with no inaccessible corners is particularly suitable. Novelty and ornamental ashtrays are usually of poor design and seldom worth the price asked for them.

**Vases,** if too highly decorated, will divert attention from the flowers they contain. As considerable variety in shapes, sizes, and colours is needed for different flower arrangements, the best plan is usually to keep most of the vases in a cupboard and to leave out, as well as those in use, only one or two which because of their shape or colouring are particularly attractive even when empty.

**Screens** are not usual, but they can be very useful—to keep a corner cosy and draughtless, to give privacy, to hide the back of a piano. They are not for small rooms, and even in large ones must be kept clear of traffic lanes. Design and colour should harmonise with the rest of the room, but may be vivid or subdued, depending on whether the screen is meant to be decorative or inconspicuous.

**Ornaments** may range from cheap and amusing trifles to rare and precious pieces of china, metal work, and sculpture. As they are ornaments, chosen for their decorative qualities as the finishing touches in the furnishing plan, there is plenty of scope for originality in selection and arrangement. Use a few at a time, and change them often; they will then be appreciated much more by those who look at them as well as by those who dust them. Group things together instead of scattering them individually.

**Mirrors** can be used to lighten a dark corner, to reflect part of the room or the view, to give an illusion of greater window space, or as alternatives to pictures. Frameless mirrors are fashionable now and look well in modern rooms, but if the furnishings are of an older type, a mirror with a simple wooden or metal frame is more appropriate.

### Treatment of Pictures

Good pictures deserve to be looked at with care and attention, so they need unobtrusive frames and clear wall space around. Many different types of pictures are available which will fit in with personal tastes and a variety of decorative schemes. Some people like to use a special picture as a main point of interest in the room, either by hanging it in a place of honour above the fireplace or in the centre of the main wall, or by basing the colours used in the room on those in the picture.

Pictures look best if they are in scale with the size of the room and if they have an atmosphere and character similar to their surroundings. Battle scenes and storms, for instance, do not fit in with the idea of peaceful sleep.

Correct framing and hanging are important in creating a pleasing effect. Pictures should be hung flat against the wall, with the fixings concealed entirely, or, if a picture rail is used, with two hangers so that the wire forms a rectangle and not a triangle. If cords or wire and hooks are used, they must be as inconspicuous as possible—the same colour as the wall background.

**In many homes accessories are not chosen carefully but just accumulate.**

Level with the eyes of an average person standing up is about the right height, but if the ceiling is high, the room may look better with the pictures a little further up. In a modern room with low furniture and ceiling they may be lowered to the eye level of a seated person. Small pictures which are similar in size and subject may be framed in the same way and hung together in a line or block.

Simple frames should always be used, especially with modern furniture. A plain wooden beading in a matching colour is suitable for photographs and unpretentious pictures; wider wooden frames, gold and silver, are used with larger, heavier, or more sophisticated pictures. Mounts of cream, white, or a neutral tone may be used as well as a frame with all kinds of pictures except oil paintings; they are necessary if the picture is hung against a patterned wallpaper.

It is obvious that the number of small things which can be included in a room is considerable, and the list given is by no means exhaustive, for where are the fire irons, the cigarette boxes, the waste paper basket, and the family photographs? A room without accessories is barren, lacking in individuality and home-like qualities: A room with too many is fussy and oppressive.

Photograph in heading by Sparrow Industrial Pictures Ltd.

## Renovation and Desecration

I RENOVATED a room recently and quite enjoyed seeing the fruits of my thrifty labours. It is wonderful what a few lengths of material and some tacks and a bit of paint will do, isn't is? But really, I often wonder if it is worth it just now, as children don't seem to get any respect for furniture and carpets and things until well after the age of six or so, do they? And some of my best things are smeared and scratched and, worst of all, have names scribbled on them in odd corners (why do they like to burst into print at such an early age?), yet I do try to train my infants in the way they should go. Still, just when I feel wrathful at some really frightful bit of desecration, one or other of the older children suddenly does something for me and I am thrilled (in the true sense of the word) and forget the other part. I hope life doesn't rush by too quickly for me during this busy period of bringing up the bairnies so that I find later on what I heard one Nana say: "I am enjoying my gradchildren far better than my own children—I was always too busy for all their little ways and sayings."—**"L." Auckland.**

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# Planning for Winter and Spring Flowers

*By* J. P. HUDSON, *Horticulturist, Wellington.*

A CAREFULLY-SELECTED range of bulbs can provide splashes of colour and features of interest in the flower garden from mid-winter until late summer. Autumn is the time to make sure that the garden is well stocked with winter- and spring-blooming bulbs, and there are many species and varieties from which to choose. An autumn sowing of flower seeds should also be made to ensure bright displays next spring.

Ranunculuses planted in March should make a brilliant display in October.

**ANNUALS** and other flower seeds sown earlier in the year where they are to flower next season should be thinned as soon as they can be handled. At the first thinning the seedlings should be left at least 1in. apart, but they should not be over-thinned in the autumn, as many of the plants may become casualties during the winter. As the young plants touch each other every other one may be pulled out, until final thinning is done in the spring when they start to grow strongly. It is still not too late to sow seeds of hardy annuals—sweet peas, calendulas, larkspurs, viscaria, Iceland poppies, and antirrhinums. If sown outdoors, the seedlings are sufficiently hardy to stand winter weather and produce early-flowering plants next spring.

**Bulbs and corms** which may be planted in March to flower in the spring include hyacinths, tulips, narcissi, crocuses, freesias, lachenalias, ixias, grape hyacinths, sparaxis, and babianas. **Hyacinths** do best in a deep, rich soil in which liberal dressings of compost or other form of humus have been incorporated. **Narcissi** (including daffodils) prefer a soil in which there is no fresh manure and which has not been limed recently. However, a dressing of blood and bone worked deeply into the soil before planting will improve both the quality of the flower and the size of the new bulbs produced next summer. Narcissi will tolerate wet soils much better than tulips. **Tulips** seem to grow best in soils which have been recently limed and dressed with blood and bone and superphosphate (at the rate of 1oz. of each a square yard). The depth at which tulips should be planted has been a subject of controversy for years. There are many advocates of deep planting, which does seem to produce more healthy plants, and in a good, deep soil tulip bulbs are often put as far as 10in. below the surface. That would be too deep for commercial practice, because of the difficulty of lifting the bulbs each year, but it is worth trying in a garden where the bulbs can be left undisturbed for several years.

**Carnation** layers which were pegged down in December should now be well rooted. Sever them from the parent plant and transplant them into the border where they are to flower next year.

**Cuttings** of violas and pansies can still be rooted in cold frames if insufficient have been propagated to make a bright show next year.

**Flower** heads should be picked off as flowers fade from herbaceous and other flowering plants. This is an everlasting job in the flower garden, but one that pays handsome dividends by prolonging the flowering season as late into the autumn as possible.

**Ranunculuses** do best in a soil which is well drained, as waterlogging injures the roots and makes the plants yellow and unhealthy. Large, sturdy, well-flowered plants can be produced only in reasonably rich soil, though they do not appreciate fresh manure. The ideal is to plant them in a soil to which a liberal dressing of compost has been added or which was well manured last season. The tubers are best soaked for 12 hours before being planted, and should then be put out 4 to 6in. apart and 2in. deep, with the claws of the roots pointing downward. Most good strains produce a high proportion of double and semi-double flowers, but all strains contain a proportion of single ones.

**Geraniums** (bedding or "zonal" and ivy-leaved types) can be propagated easily from cuttings. Though these will root at almost any time of the year, they are best taken in summer and autumn. Pieces of new growth, 3 to 4in. long, should be cut off and the base of each carefully trimmed back with a razor blade to just below the bottom leaf. The bottom two or three leaves should be removed and the cuttings dibbled 3in. apart into firm, light, sandy soil in a frame or warm border. The hole should be made with a flat-ended dibber so that the cut end of the cutting is in contact with the soil. Cuttings require very little water until they start to grow. These types of geranium, and especially Paul Crampel and King of Denmark, are liable to be attacked by a virus disease which causes pale yellow spots to appear on the leaves. The spots later die out and the leaves become crinkled and puckered; in

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# ABORTION *must* be *Stamped out!*

*This is what the McMillan Report on Abortion said in 1937:*

**"It has been estimated that at least one pregnancy in every *five* ends in abortion; in other words that some 6000 abortions occur in New Zealand every year. Of these it is believed that 4000, at a conservative estimate, are criminally induced..."**

That was 10 years ago. Today abortion is still inexcusably high.

A recent group survey showed that for every 100 births there were *seven* accidental abortions (miscarriages) and THIRTEEN induced abortions.

*Illegally induced abortion* is a crime against womanhood and against humanity. Those who condone it are as guilty as those who practise it.

*Accidental abortion* is best prevented by antenatal care.

Public conscience and public opinion can fight for safe and sane motherhood.

ISSUED BY THE DEPARTMENT OF HEALTH

*Keep this announcement for future reference.*

11c

severe cases the whole plant may become malformed. Infected plants should be pulled out and burned as soon as the symptoms are noticed, as there is no cure, and cuttings should never be taken from infected plants, as that is the principal way in which the disease is spread.

**Iris** species which flower in mid-winter should be planted in March, the bulbs being put in 3in. deep in light, well-drained situations where no animal manure has been used recently, as the iris flowers most freely in a poor soil. It is, however, an advantage to lime the soil, as the species do not thrive if the soil is acid. *Iris unguicularis* (more usually called *I. stylosa*) is a lovely species, with pale violet petals and a deep yellow throat surrounded by a white ground with purple markings. *Iris reticulata* has velvety purple petals and an orange throat. Both these species will flower regularly in mid-winter, and are best left for some years without being lifted if the situation seems to suit them.

**Lawns** are most easily established from an autumn sowing in all but the coldest districts. Seeds may be sown in March or April, provided the soil has been thoroughly and evenly firmed and a shallow, loose surface layer obtained in which to sow seeds. Grass seed should never be sown on loose, lumpy soil, which will later settle and cause irregularities in the surface. The best mixture of grass seeds to use is undoubtedly 2 parts of New Zealand chewings fescue and 1 part of Government Certified browntop, sown evenly at the rate of 1oz. of the mixture a square yard.

Where grass has suffered from wear or the attacks of grass-grub or caterpillar, bare patches will now be showing. These should be carefully and lightly forked to break up the surface, and fresh grass seed should be sown as soon as the soil can be broken down into a fine tilth. After growing quickly through the summer months, the lawn should be given a topdressing of fertiliser in March to replace the plant foods removed during the growing season. A mixture of 3 parts of sulphate of ammonia, 2 parts of superphosphate, and 1 part of sulphate of iron, applied at the rate of 1oz. a square yard, is recommended, but in lawns where clover does not develop (on acid soils) 1 part of dried blood may be substituted for the sulphate of iron.

Ixia bulbs planted now will produce their dainty flowers on fine, wire-like stems from October to December. They are excellent flowers for cutting.

**Potpourri** of roses can be made by picking the petals from **scented** roses in fine weather and drying them slowly in the sun on sheets of paper until they crackle slightly when touched. To make a moist potpourri suitable for bowls add a little of the following mixture of aromatic oils: Equal parts of oil of almonds, oil of cloves, essence of rosemary, and essence of bergamot, with a few drops of essence of musk. For a dry potpourri suitable for sachets, sprinkle the dried petals with a little bay salt and add powdered orris root, a little all-spice and mace, and a small lump of gum olibanum.

**Shrub cuttings** inserted in a frame in January should now be rooted and ready to plant out. If the cuttings are left for long in the frame after they are rooted, they become drawn and crowded and their roots suffer severe mutilation when they are planted out. Rooted cuttings may be planted straight into their permanent positions, but are better planted 8in. to 1ft. apart in a nursery bed, where they can be left for another season before being planted out. In that way stronger bushes are produced, and they are less liable to be overlooked or injured when planted out among other and possibly larger ones in the border or shrubbery. **Small plants put between larger, well-established ones are often overshadowed and killed by their stronger-growing neighbours, and the sturdier they are when planted the better is their chance of survival.**

**Violets** can be had in flower through the late winter and early spring in very cold districts if plants are lifted in March and planted in a cold frame. They should be dug up with as many roots as possible to minimise the check of lifting, and watered in with a watering can fitted with a rose.

## Wrenching a Plant

**"Wrenching"** is a term used by nurserymen which often confuses the gardening public. When a plant is lifted a great proportion of its roots are inevitably damaged. This is a shock to the plant, and the greater the proportion of roots damaged the greater the shock. Most of the food and water which plants take from the ground is absorbed by the finer roots which clothe the outer branches of

Among the few bulbs with blue flowers, babianas are useful for cutting from October to December. Bulbs should be planted in the autumn.

the root system. It is these delicate, but essential, roots which are most damaged by lifting.

The shock of lifting can be lessened by cutting part way round each plant a few weeks before it is lifted, driving a spade vertically into the ground at a distance from the main stem equal to about a quarter of the plant's diameter. That severs a considerable proportion of the roots, but leaves some uninjured, including those which go vertically into the soil. The uninjured roots maintain the food and water supply of the plant, while the severed roots begin to form new rootlets. When the plant is lifted six weeks or so after wrenching, the roots originally cut should have developed or be about to develop enough fibrous roots to start taking in water as soon as the plant is set out in its new position, and so enable it to recover quickly from the check of being moved.

## Reminders About Common Troubles

**Thrips** infest a wide range of ornamental and crop plants, and, though not native to New Zealand, are widespread in gardens in the Dominion. The insects are very small, active creatures, with cigar-shaped bodies, yellow when young and black when adult. The adults have curious narrow wings fringed with hairs and they fly freely. Thrips scrape the surface of plants and feed on the sap, leaving a characteristic silver scurf on the foliage or flowers which they have attacked. This silver surface may later go brown.

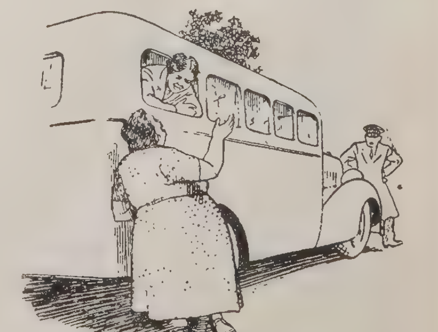
Thrips can be controlled by spraying with nicotine solution (2oz. of soap powder dissolved in a little hot water and added, together with 1 fluid oz. of nicotine sulphate, to 4 gallons of water). The spray is more effective if 1 per cent. of summer oil emulsion is added. A second application should always be made about 14 days after the first to destroy young thrips which have hatched from eggs not killed by the first wash.

**Tomato spotted wilt virus** frequently attacks nasturtiums, the leaves of which show yellow mottles and spots which may almost cover the surface, while the plants become stunted. As nasturtiums frequently over-winter in mild districts, they serve (with other plants) to carry the spotted wilt disease from one year to the next. All nasturtiums which show mottling or distortion of the leaves should be pulled out and burned.

**"Woolly bear" caterpillars** are the black, hairy larvae often found feeding on cinerarias, eating holes in the leaves, which are left looking unsightly and ragged. The adult stage of this insect is the magpie moth, easily recognised from its colouring of black with orange bands on its body and white spots on the wings. The caterpillars feed fully exposed on the leaves, so they can be controlled fairly easily by hand picking and killing them, though care should be taken, as the hairs are said to be dangerous if they get into the eyes. A derris dust can also be used to control these caterpillars.

## "A Time and Place . . . "

WE had been wedged in a crowded service car for many hours of uneventful travel through desolate countryside, and most of the passengers looked bored and tired. We were half-way up a steep gradient when urgent shouts were heard from a stout, middle-aged, colourfully-dressed Maori woman, who lumbered down a nearby slope and who obviously wanted to catch the bus. With great difficulty our driver applied the brakes, bringing our giant vehicle to a halt. The door was opened and those standing moved back to make room for the would-be passenger. However, no one appeared! Then we heard rapid, excited ejaculations in Maori. Intrigued, the more curious of us turned round to discover the shrivelled, tattooed, be-shawled old woman in the corner was leaning out the window animatedly conversing with the now beaming person who had hailed us. The driver then extricated himself from the wheel, swung on the bus steps, and shouted in irate tones, "Come and get on. I can't wait all day!"



The Maori woman turned a happy, unconcerned face and casually replied, "You go on now—I wanted to talk—haven't seen her long time."

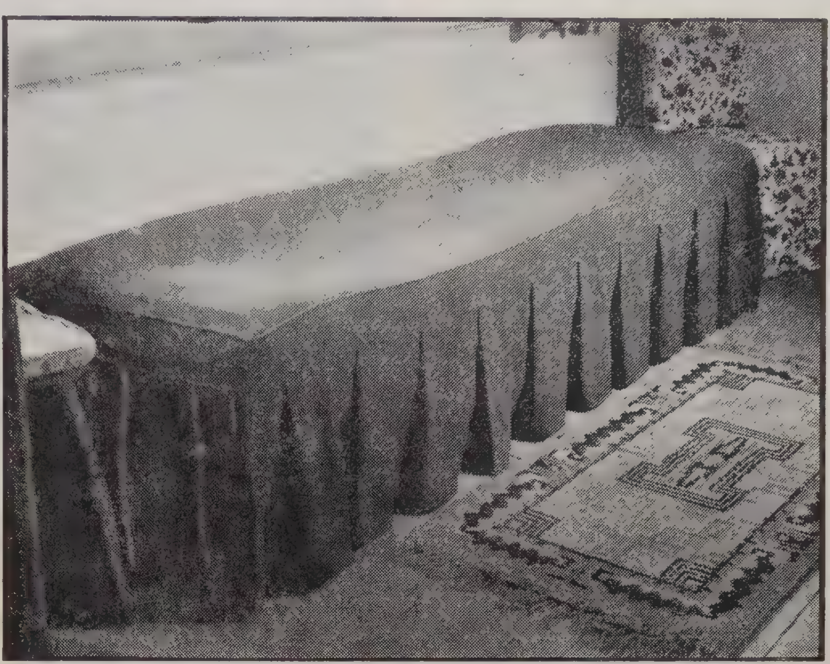
Amazement and anger chased themselves across the driver's face. In his bewilderment he was speechless. Then he shrugged his shouders expressively and said, "Well, for crying out loud!"

How we all laughed, the more so as our smiling friend by the roadside farewelled us by waving gaily.—**"Bry," Eltham.**

# A Home-made Divan-type Seat

*By* EVA TOPPING,
*Rural Sociologist, Auckland.*

FOR a window, sunporch, kitchen, or small living room in which an upholstered settee looks too large, a divan-type seat is a useful piece of furniture. Such a seat can be used as an extra bed, for a convalescent or for an afternoon nap, and is more comfortable to lie on than a settee. Most homes can find a use for a seat of this sort, and this article describes a neat and comfortable one made from materials which are usually fairly easy to obtain on a farm.



THE framework for the seat is 16in. high, 2ft. wide, and 6ft. long. The seat part is made of strong fencing wire, or heavy sheep netting can be used as illustrated. The sides are of 4in. x 1in. timber and the legs of 4in. x 1½in. The wire is stapled on to the frame and the edges covered with 1½in. moulding so that no ends are exposed to catch on the cover or clothing.

The timber should be planed and sandpapered to a smooth surface and the legs stained, varnished, or painted. Two carriage bolts, set in as shown in the illustrations, make the legs quite rigid.

## Padding for Seat

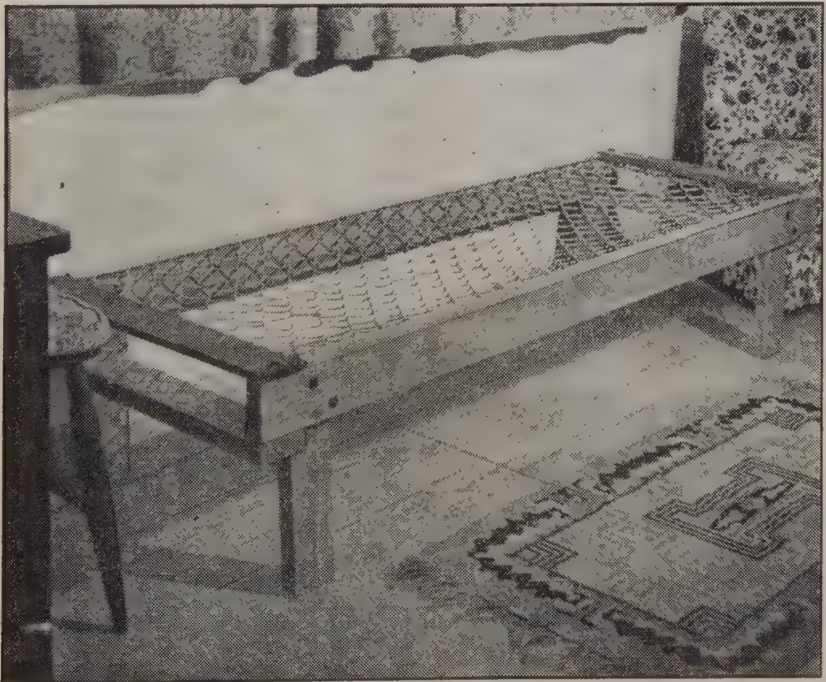
A single-bed mattress can be used for padding the top. One which has become too thin for a bed will serve very well, as the bed size, 2ft. 6in. or 3ft., is too wide for the seat and will have to be altered to fit; the surplus stuffing can be used to make the mattress thicker.

Measure the required width, 2ft., and put in a row of pins to make the new edge. Cut along the top of the ticking, leaving a good turning, about 1in. wide. Break off the extra filling and push it over into the mattress, spreading it evenly so that the new surface will not be lumpy. Take the outer edge of the mattress cover and pin it on the marked line; oversew, using close stitching and heavy cotton (No. 24) or linen thread. Turn the mattress over gently to avoid disturbing the loose stuffing, and take up the extra ticking on the under side to correspond with the side already done. Oversew as before, making the corners neat and quite square so that the outer cover will set well.

The photograph of the corner shows what the altered mattress should look like.

## Making the Cover

Materials for the cover will be found in the soft furnishing lines: Cotton tapestry, cretonne, linen, and chintz are all suitable, though velvet types and richer materials would make a more sumptuous article. Haircords, casement cloth, cotton prints, and gingham make serviceable, easily-laundered, and less expensive coverings which are quite in keeping with the usual interior decorations of sunporch, bedroom, or kitchen-living room.



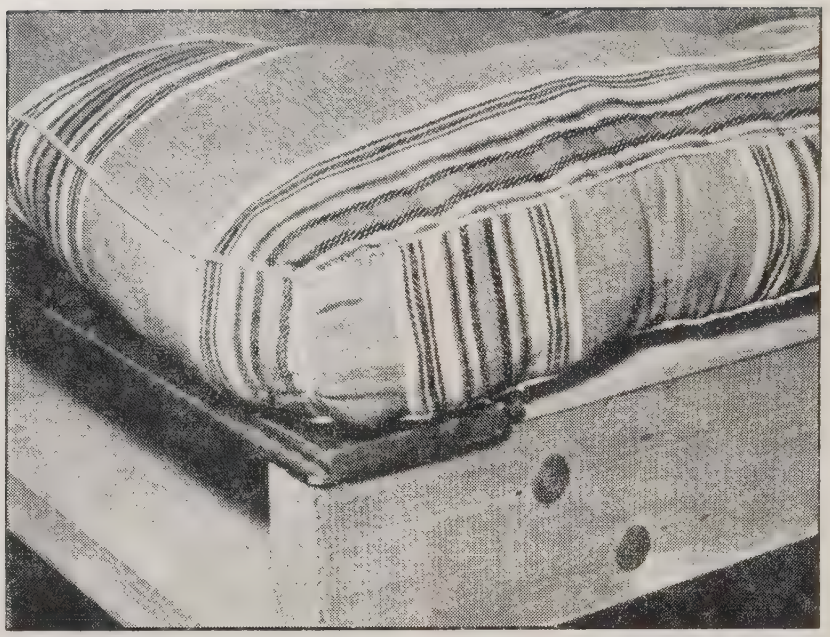
**The framework of the seat.**

## DIVAN-TYPE SEAT . . .

For a cover with a pleated flounce like that illustrated the material required is 4yd. of 60in. wide, 7½yd. of 30in., or 7yd. of 36in. That amount allows for ample turnings, etc., but not for wastage in matching a large pattern. Less material is needed if the flounce is only gathered on or if the pleats are placed at wider intervals. About 11yd. of piping cord or heavy twine is also needed.

Cut a piece of material 26in. wide by 2yd. 2in. long for the top, thus giving 1in. turning all round. Next, cut 5in. wide strips for the panel to run right round the seat. In most widths of material the two long sides can be got out of the same length as the top, leaving only the two ends to be cut from the remaining material; join them to give required length. Lay on the cord at each side and turn the material back about ¾in. Machine stitch close to the cord.

Pin the top cover on to the mattress **right side up** and pin the corded panel on, leaving 1in. turnings on the top part. Make the corners square and fit the cover carefully. Tack and machine on over the first row of stitching, keeping close to the cord again. Finish the open ends of the panel—it will be found easier to do this neatly at a corner or at the centre of one of the ends of the cover.



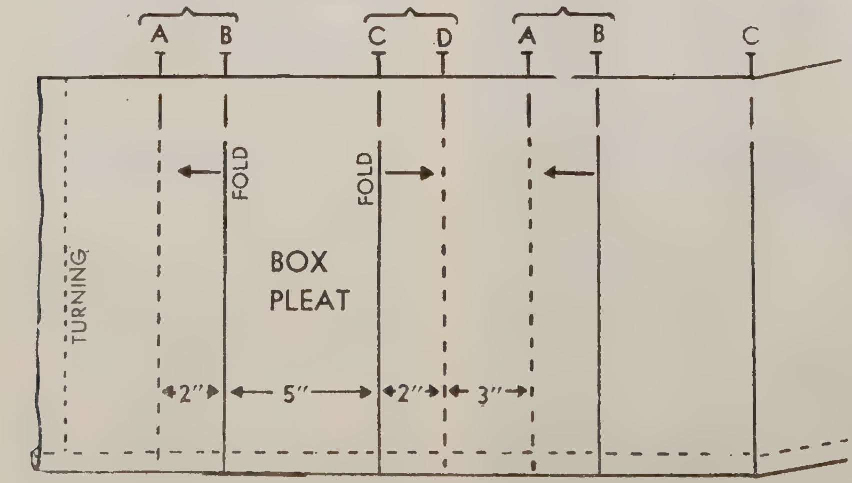
A corner of the altered mattress.

### Gathered Flounce

If the flounce is to be gathered on, a length equal to about 1½ times the measurement round the seat will be sufficient—that is, a strip 15in. wide by 9yd. long. Make the joins, hem the bottom edge, and gather the top. Set pins to mark each yard and half-yard of the flounce and corresponding places on the panel of the top cover, which should again be pinned on to the mattress.

Start in the centre of a side and pin the two marked places together, lapping the panel over the flounce to give the correct length. Do not have the flounce either too high or dragging on the floor—let it just clear the floor easily. Distribute the fullness evenly, pin securely, tack and then remove the cover and stitch it, keeping close to the cord.

PLEATING THE FLOUNCE



Fold B back over A; fold C forward over D. Five-inch pleats, with 2in. under for folds and 3in. spaces between pleats.

### Pleated Flounce

If a pleated flounce like that illustrated is chosen, here is how it is made:

Cut the strips 15in. wide again, but a little longer—about 10½yd. Join them, but leave the two ends free to give a continuous length. Make the hem.

**Be sure you have plenty of pins for the next step.**

Lay the material right side up on a large table to make the pleats. Measure 4in. along (allowing 1in. for the last join) and mark: fold back a 1in. pleat and pin at top and at the hem. Measure another 5in. for the box pleat and mark. Measure 2in., mark, and make a pleat in the opposite direction to the first. Now one pleat is in position.

Measure 3in. and mark. Measure 2in., fold the second mark back over the first, and pin the pleat in again. Measure 5in. and 2in. and make the other side of the box pleat. Continue making box pleats 5in. wide and 3in apart with 1in. folds. The diagram shows the method clearly.

Press the pleats in well with a hot iron, using a damp cloth if necessary. Take the flounce and pin it in position, making one pleat fit round a corner and keeping the edge at the correct height from the floor. Pin firmly, tack, and machine, keeping the stitching close to the cord.

Photographs by Sparrow Industrial Pictures Ltd.

# First Aid Treatment of Unconsciousness

*By* C. MEACHEN, *Secretary, St. John Ambulance Association, Wellington.*

**UNCONSCIOUSNESS may be caused by injury, sudden illness, poisoning, disease, or shock to the nervous system, or by asphyxia, a condition affecting the respiratory and circulatory systems which is caused by restriction of the supply of oxygen to the lungs. A patient may be in a state of stupor or delirium for some time after an injury occurs or the onset of an illness, and may not become completely unconscious for some time.**

GENERAL principles in the treatment of unconsciousness are:—

1. Immediately remove the patient to fresh air or away from the cause of unconsciousness.
2. Lay the patient on the back and loosen tight clothing round the neck and chest.
3. If the face is flushed and congested, raise and support the head and shoulders and apply warmth to the legs and feet.
4. If the face is pale, lower the head and turn it to one side.
5. Make sure that breathing is possible by examining the air passages.
6. If breathing has stopped or is failing, turn the patient face downward and apply artificial respiration.
7. Arrest any apparent hemorrhage and treat for any other injuries or complications present.
8. Keep the patient warm to prevent or lessen the effects of shock.
9. Do not give stimulants, fluids, or food of any kind while the patient is unconscious. When the patient is able to swallow, sips of warm tea, black coffee, milk, or other non-alcoholic stimulant may be given if the patient has no hemorrhage or head or internal injuries.
10. Cover the patient and do not allow exertion of any kind.
11. Watch the breathing very closely, especially in cases of electric shock, suffocation by gases and fumes, and poisoning, guarding against the possibility of secondary collapse.
12. Send for a doctor in all cases suspected to be serious.

## Electric Shock

**Quickly switch off the current** if possible, or release the patient from parts charged with electricity. Those assisting must take precautions to protect themselves from contact with the patient's body or with wires, etc.

**Insulate yourself** from the earth by standing on a non-conductor of electricity, such as rubber, linoleum, or dry clothing.

**Protect your hands and body** with rubber gloves, dry folded newspaper, or dry clothing, or drag the patient away from electric wires with a dry rope made into a loop, a dry rubber hose, or other dry non-conducting articles that can be hooked in the clothing. Avoid touching wet clothing on the patient or boots which have nailed soles. Do not grip under the armpits, because the clothing there is usually wet from perspiration.

**Apply artificial respiration** immediately the patient has been released from contact, even if breathing has not stopped.

**Treat the patient for shock** by keeping him warm, and by giving a non-alcoholic stimulant if he is conscious and able to swallow.

**Treat burns** caused by the electricity and cover the part well. Use tannic acid if it is available.

**Watch the breathing** closely. If it is laboured, or fails after having been restored, apply artificial respiration again. In many cases of electric shock the breathing will cease suddenly after having been restored and the patient will lapse into unconsciousness without warning. That is caused by the very severe shock, which affects all the organs and systems, especially the nervous system.

**Send for a doctor** as soon as possible in all cases of electric shock.

## Drowning

**Lose no time in starting artificial respiration** immediately the patient has been carried above high-water mark and the air passages have been examined for obstructions.

**Adjust the patient's position.** Lay the patient face downward with the arms above the head and, if there are no injuries to the chest or back, perform artificial respiration by the Schafer method (illustrated in the "Journal" in December).

**If the face is congested** but there are no injuries to the body and arms, apply artificial respiration by the Sylvester method, in which a pillow or bundle of clothing is placed under the shoulder blades and the head allowed to drop backward.

**Promote warmth and circulation.** If you are working single-handed, the breathing must be restored first. Then warmth and circulation can be promoted by removing the patient's wet clothes, wrapping him in warm blankets, and applying well-wrapped hot water bags or bottles, or warmed bricks, to the body. Warmth and circulation may also be promoted by rubbing the patient's body toward the heart. If assistance is available, the promotion of warmth and circulation may be started immediately the patient is in position and while the operator is performing the artificial respiration.

**Watch the breathing.** If breathing is difficult or failing, or stops again after having been restored, immediately apply artificial respiration again.

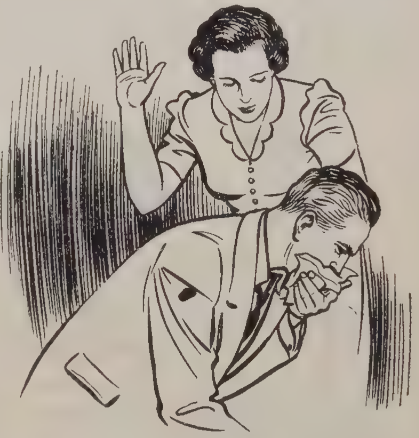
**If the throat is swollen,** making breathing difficult, apply hot flannels or poultices to the front of the neck, and give sips of cold water if the patient is conscious.

**Stimulants:** When the patient is conscious and able to swallow, warm drinks of tea, coffee, or milk are the best stimulants to give.

**Call a doctor.** The patient should receive proper medical attention **in all** cases in which the breathing has been suspended.

## Choking

**Remove the obstruction in the throat immediately** by slapping the patient sharply on the back between the shoulder blades. If that fails, put the index finger to the back of the throat and try to pull the obstruction out. If that is not possible, try to push it down the gullet past the entrance to the windpipe.



**Loosen tight clothing** from the neck to the waist.

**If breathing has stopped,** as soon as the throat is clear of obstruction apply artificial respiration by the Schafer method and promote warmth and circulation as for cases of drowning.

## Constricting Bands Round the Neck

**Cut or remove the bands immediately.**

**Loosen tight clothing** from the neck to the waist.

# FIRST AID FOR UNCONSCIOUSNESS . . .

**Examine the air passages** and make sure that breathing is possible.

**If breathing has stopped** or is failing, immediately apply artificial respiration by the Schafer method.

**If the throat and neck are swollen,** making breathing difficult, apply hot flannels or poultices to the front of the neck, and give sips of iced or cold water if the patient is conscious.

**Promote warmth and circulation** in the same way as for cases of drowning.

## Hanging

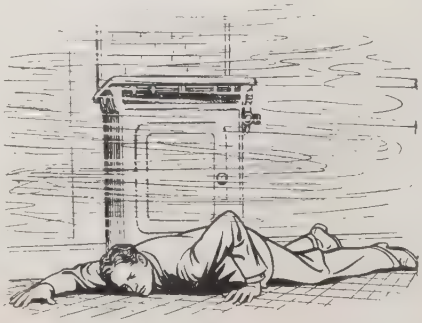
**Cut the patient down.** Immediately relieve the strain on the neck by supporting the weight of the body, and have the rope cut or removed.

Apply the general principles of treatment for cases of unconsciousness.

## Asphyxiation or Suffocation

Gases and fumes, apart from causing asphyxiation and suffocation when inhaled, cause a general weakening and poisoning of the whole respiratory system. That condition is brought about by the poison circulated in the bloodstream to all parts of the body. Therefore the patient must have plenty of oxygen from fresh air, the circulation must be stimulated, and the breathing must be assisted artificially. When breathing has been restored it must be watched very closely in case it fails again, which is a grave possibility in these cases, because the respiratory and circulatory organs in their weak and poisoned state cannot perform their normal functions without assistance and stimulation.

**Move the patient into fresh air immediately,** bearing in mind that it may be necessary to protect yourself while doing so. If it is not possible to flood the atmosphere with fresh air by opening doors and windows, cover the nose and mouth with some damp material to filter the poisoned air. As most gases rise, keep as near as possible to the ground when entering gas-filled spaces, thus avoiding the higher concentrations of gas.



**Apply warm and cold douches** to the head, neck, and chest as soon as the patient has been carried to fresh air.

**If breathing has stopped,** it must be restored, and warmth and circulation must be promoted as soon as possible.

**Give an emetic** of 1 tablespoonful of mustard in ½ pint of water when the patient is conscious and able to swallow. That will cause vomiting and rid the stomach of its poisonous contents.

**Give a stimulant** of warm tea, black coffee, or milk when the emetic has acted.

**Keep the patient warm.** Wrap him in warm blankets, and apply warmth and friction to body and limbs. Provide shelter to guard against further shock and collapse.

**Watch the breathing very closely** in case it again fails after having been restored. If necessary, apply artificial respiration again.

**Call a doctor** as soon as possible, especially if the breathing has been suspended.

## Sunstroke and Heatstroke

Symptoms of sunstroke or heatstroke: After exposure to intense heat or to the sun in hot weather the patient becomes faint, giddy, thirsty,

*For his Lordship*
**THE BABY**

**RELAX**
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This plunket style cot is designed for baby's comfort. It is strongly built and the deep, wide hammock is of good quality duck. It can be rolled compactly when not in use—so convenient for travelling.

**RELAX FOLDING PLAY-PEN**

Enables baby plenty of room to play in complete safety. The "RELAX" Play-pen is a marvel of ingenuity—it can be folded completely flat for travelling. The small illustration shows the pen folded pyramid-fashion to make a very effective clothes drier.

**RELAX**
**DROP-SIDE COT**

An improved sliding device which cannot wear out or fail makes the "RELAX" Drop-side Cot *absolutely safe.* The mattress support is made of flexible battens combining comfort and strength. The cot is supplied in either plain or varnished wood—it can be packed flat in 6 minutes for transporting.

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*You can Rely on*

**'RELAX'**

Manufactured by
J. J. McCASKEY & SON LTD., Walter Street, Wellington.

delirious, or unconscious; the skin is very hot, the face is flushed, the temperature is high, and the pulse is quick and bounding; the breathing becomes difficult, loud, and snorting.

**Carry the patient to a cool place immediately.** Lay him down, raising and supporting the head and shoulders.

**Remove clothing from the waist up.**

**Bathe the head, neck, and spine freely** with iced or cold water and apply ice to the head.

**Do not give stimulants,** but if the patient is conscious, water may be given.

**Call a doctor** as soon as possible.

## Fainting

Fainting is a condition of collapse caused by blood leaving the head. The patient falls down, generally passing into a state of unconsciousness without convulsions. It may be caused by shock, fright, injury, sickness, weakness, the effects of disease, over-exertion, heat, deficiency of oxygen in the air, starvation, or excitement.

Symptoms are: The patient yawns (a sign known as air hunger); he feels cold and shivering, the skin becomes pale, and the lips take on a bloodless colour; beads of cold sweat break out on the forehead and skin, which develops a goose-flesh appearance; the breathing becomes panting and the patient falls into a state of collapse; the pulse is weak and almost imperceptible.

**Carry the patient into fresh air immediately.**

**Loosen tight clothing** round the neck and chest, making sure that breathing is possible.

**Lay the patient flat** if possible, with the head low and turned to one side. In severe cases raise the feet.

**Keep the patient warm** to prevent further shock.

**Ammonia, sal volatile, or smelling salts** on cottonwool may be held near the patient's nostrils as a form of stimulation.

**When the patient regains consciousness,** but not before, a stimulant may be given if the faint has not been caused by bleeding or head injuries.

**Arrest any bleeding immediately** and attend to any other injuries.

**Call a doctor** if the case appears to be serious.

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## *WISDOM*

*By keeping silence when we ought to speak, men may be lost.*
*By speaking when we ought to keep silence, we waste our words.*
*The wise man is careful to do neither.*
—Confucius.

# RURAL HOUSING SURVEY

## PLANNING THE NEW: IMPROVING THE OLD

A RECENT article in a Canadian agricultural periodical gives some interesting facts about farm housing in that Dominion. The writer says: "The present standard of farm houses has reached such a low level that remedial action has become a matter of primary importance." He reports the findings and recommendations of one of the sub-committees of the Advisory Committee on Reconstruction set up to investigate housing problems in Canada and which devoted a special section to the needs of the farm population. This sub-committee found four types of need: Replacement of farm houses in such a poor condition that they should be rebuilt; new homes for farm families who are at present sharing their houses with other families; replacement and repair of homes which are becoming obsolete and run down; and the provision of cottages for farm employees. Surveys showed that nearly 40 per cent. of farm dwellings were obviously in need of repairs to foundations, walls, roofs, chimneys, doors, and windows.

The sub-committee realised that a farm house must be designed quite differently from an urban house because it is an integral part of the farm plan. The kitchen, dining-room, and porch are often turned into workshops where farm products are prepared for market. Washing, cooking, making butter, preserving fruits and other foodstuffs, and storing them for winter use must be managed in the farm home, and it should be built to meet these needs. In its report the sub-committee calls for the co-operation of the various Departments of Agriculture across Canada, architects familiar with rural conditions, farmers, and farm housewives.

**The state of rural housing in New Zealand is not accurately known, but it is certain that many new farm houses will be built in the next few years, and many families will alter and adapt their present homes. The Department of Agriculture is constituting a new service for farm people which will provide plans for homes and helpful suggestions about installing up-to-date facilities in older houses.**

To prepare these plans in accordance with requirements for comfortable living in rural areas information is required, some of which can be obtained only from farm families. A questionnaire has been drawn up by the Rural Sociology Section which asks about the age, size, and equipment of the house, and the preferences of the family in such respects as size and type of rooms, equipment, porches, and type of cooking facilities.

Country families are invited to help with this survey, and any information given will be greatly appreciated and regarded as confidential. Fill in the application form for a questionnaire below, post it to the Rural Sociologist for the district, and have the family help in completing it.

**The Rural Sociologists will also answer enquiries from country women about nutrition, preparation and preserving of food, and home management generally. Make use of this service.**

| | |
|---|---|
| North Auckland and Auckland: | Rural Sociologist,<br>Department of Agriculture,<br>AUCKLAND. |
| Taranaki, Wellington, Hawke's Bay, Gisborne, Nelson, and Marlborough: | Rural Sociologist,<br>Department of Agriculture,<br>WELLINGTON. |
| Canterbury, Westland, Otago, and Southland: | Rural Sociologist,<br>Department of Agriculture,<br>CHRISTCHURCH. |

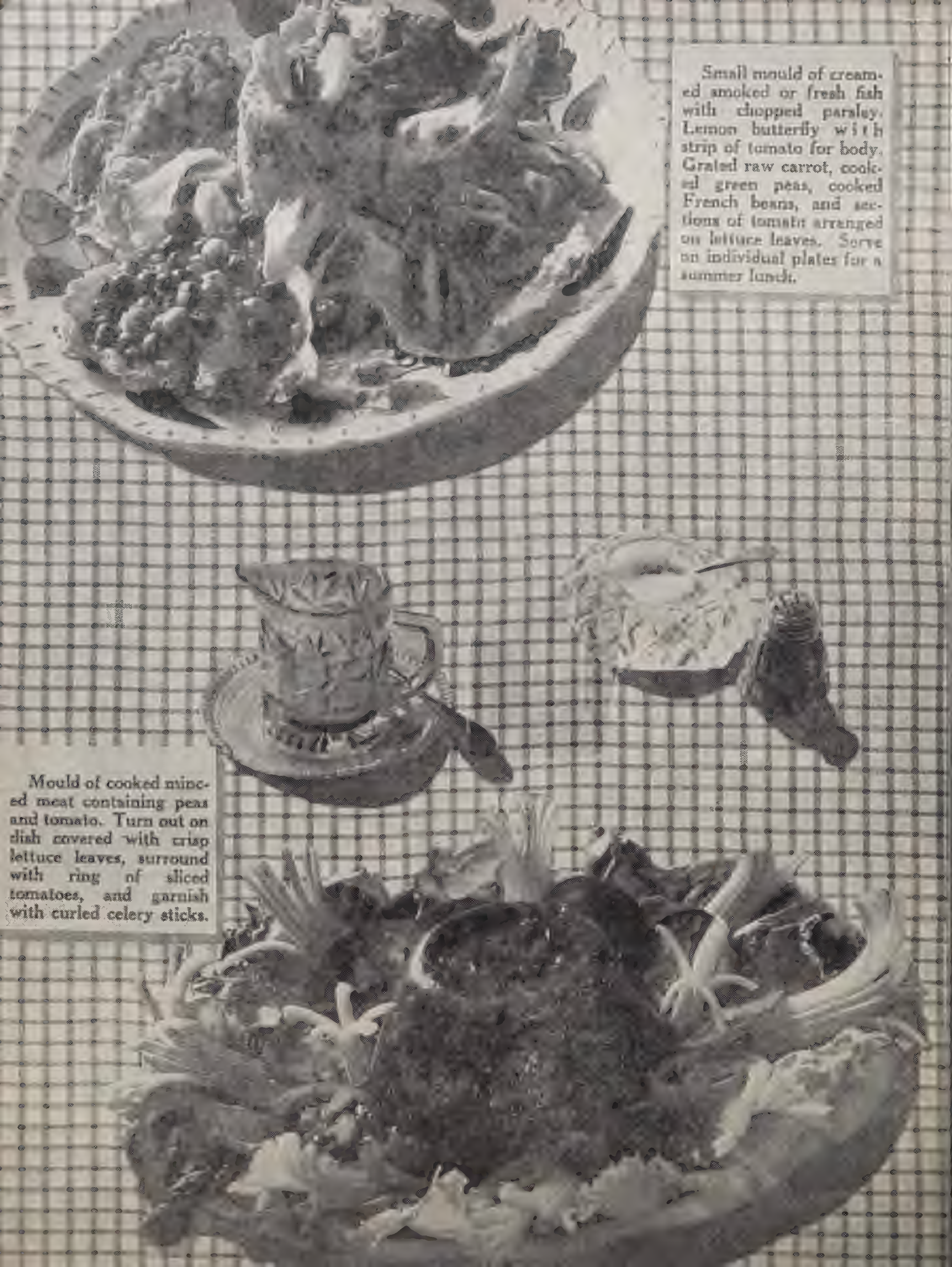
**The Rural Sociologist, Department of Agriculture,**

.............. .. ................

**Please forward me......copies of the questionnaire on Rural Housing.**

**Name** (Mr., Mrs., Miss):.................. ........ .. ..
**(Block letters)**

**Address:** ................................ .. ..............
................................ ..............
................................ ..............



Small mould of creamed smoked or fresh fish with chopped parsley. Lemon butterfly with strip of tomato for body. Grated raw carrot, cooked green peas, cooked French beans, and sections of tomato arranged on lettuce leaves. Serve on individual plates for a summer lunch.

Mould of cooked minced meat containing peas and tomato. Turn out on dish covered with crisp lettuce leaves, surround with ring of sliced tomatoes, and garnish with curled celery sticks.

# *Variety in Salads*

*By* EVA TOPPING, *Rural Sociologist, Auckland.*

*TO many people "salad" suggests nothing more than shredded lettuce with sliced tomatoes and, perhaps, cucumbers, radishes, and spring onions; but the variety of salads is almost endless, and vegetables both cooked and raw can be added to provide interesting and unusual dishes. By using various vegetable combinations the "salad season" can be made to last the whole year round, and as most vegetables contain vitamin C, salads can be used to provide part of the daily supply of this vitamin when fruit is scarce or unprocurable. Minerals, roughage, and bulk are also supplied by fresh vegetables.*

A GREEN-LEAF vegetable should form the basis of a salad. Lettuce is the most commonly used, but many more can be included in the list of possibilities, and most of the other greens actually contain far more vitamin C. Raw shredded heart of young cabbage, tender celery leaves, green tops of spring onions, chives, mustard cress, watercress, parsley, nasturtium leaves, mint, young dandelion leaves, and endive—any of these greens can be substituted for the more orthodox lettuce. Turnip leaves are also used, but the "hairiness" of the texture is distasteful to many people. Young, tender root vegetables may be used raw; grated raw carrot is crisp and appetising; shredded raw beetroot makes excellent "trimming" and is a change from the more usual mode of serving. Cooked carrot, potato, parsnip, swede, turnip, and beetroot make good salads and afford a way of using "left-overs" without reheating.

Other ingredients for salads are radishes, tomatoes, peas, beans, celery, tree tomatoes, green peppers or capsicums, cucumber, grapefruit, oranges, dates, nuts, raisins, cauliflower, asparagus, and apples. Variations in flavourings for salads are obtainable by including herbs, parsley, chives, spring onion tops, horseradish, and various dressings. Garnishings or decorations can be made of parsley, onion, celery, radish, tomato, carrot, hard-boiled egg, etc. To make curled celery, cut 3in. lengths of crisp celery sticks. Slit the pieces down 1in. deep into thin strips and cut through the fibre on the outside of the stalks at the base of the slits. Leave standing in cold water until the cut ends curl. For radish roses cut turnip-shaped radishes down at the root end into four or six sections, taking care not to make the cut right through. Leave in cold water until the sections open out. Carrot sticks are made by cutting pieces of carrot into strips about the thickness and the length of a match. Use round spring onions and cut into thin slices for onion rings, separating the sections under water.

## Preparation of Ingredients

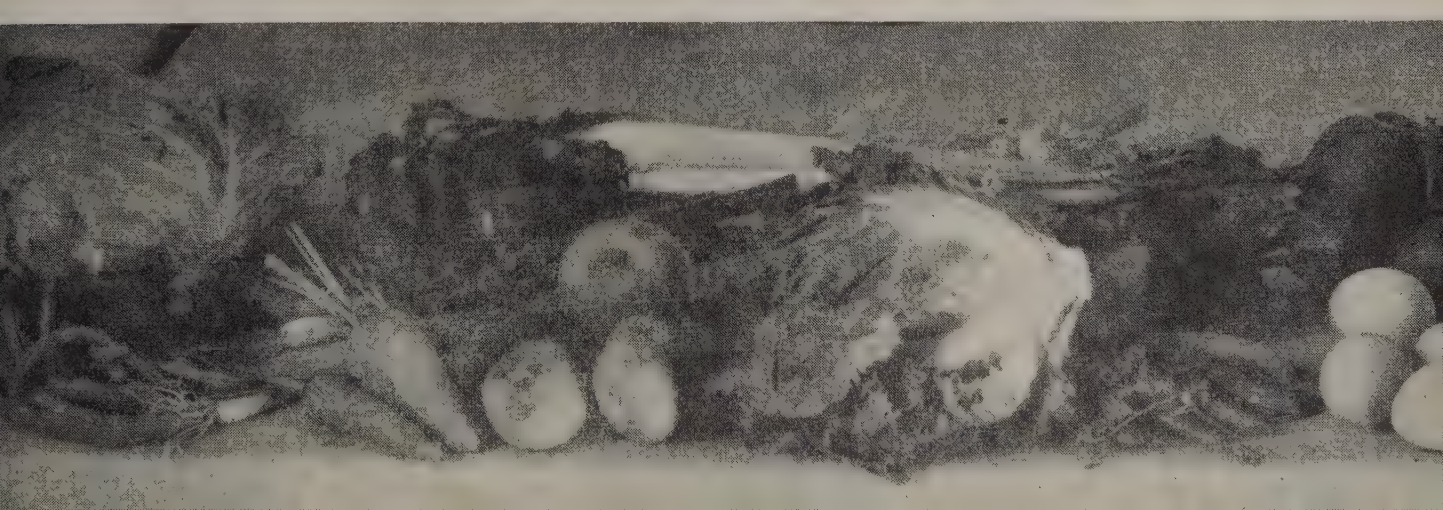
Lettuce and other green stuff are best if used as soon as possible after picking or buying, as the vitamin content continuously decreases after the vegetables have been gathered. For the same reason green vegetables should not be cut up until just before serving. If it is necessary to store the lettuce for a while, put it in a saucepan with a well-fitting lid and stand on a cool floor. To crisp wilted leaves let them lie in cold water for about one hour, drain and roll up in cloth, and stand in the coldest place available. Wash greenstuff carefully in cold water to remove soil, spray, and insects; shake off water gently and dry in a clean cloth or toss into a wire basket to drain.

Whole lettuce leaves are required for some salads, and it is often difficult to take them from a well-grown lettuce with a firm heart. Take off the outer leaves, cut out the stalk base and hold the lettuce inverted under running water. The force will make the leaves separate and they can then be detached without tearing. Shred raw green vegetables with a sharp knife; hearts of cabbage should be cut very fine, but lettuce and tender greens can be cut more coarsely. Wash carrots and scrape them lightly; grate them if they are to be used raw. Turnips and swedes are sometimes found to be too strongly flavoured for using raw, but when cooked and then diced or sliced they are acceptable. All cooked vegetables should be drained well and be quite dry and cold before combining with the rest of the salad, and green stuff should be crisp and handled as little as possible.

A salad can easily be the most decorative part of the meal table, for well-chosen arrangements of the different ingredients are very colourful. When the main dish is to be salad, eggs, meat, fish, or cheese should be included to provide proteins. Served with bread or potatoes such a salad will provide a satisfying and nutritious meal. Many people find a meal of this kind more attractive if soup is served first or a hot sweet follows

## Serving Salads

Salads may be made in a bowl, and served with spoon and fork by one person, or may be handed round the table. Another way is to place the mixed portions of salad on "nests" or "cups" of lettuce leaves and arrange on one flat plate or dish for ease in serving. If desired, some salads can be arranged on individual plates, and this way of serving is very useful when a salad is to form the main dish at the meal. Small moulds of fish, cooked meat, tomato or beetroot, set on lettuce with little mounds of various vegetables arranged round, make an attractive and healthful lunch dish. These jellied salads, whether large or small, are particularly suitable for summer meals.



Halve hard-boiled eggs to make cups, cutting a slice from each end so they will stand. Remove the yolks and blend with a little thick salad dressing, salt, and pepper. Curry powder, onion juice, or other flavourings can be added as desired. Roll into small marbles, putting three in each half-egg. Decorate with parsley, and set on a bed of finely-shredded heart of cabbage, chopped parsley and chives, onion, or shallot. Garnish with curled celery, grated carrot, or beetroot.

**WATER LILY SALAD:** Choose large smooth tomatoes, one for each person, and remove skin and stalk. Slice into sections with a sharp knife towards stalk end to make petals. Leave tomato centres in and cover with finely-grated cheese to represent stamens. Slice cucumber and arrange on plates, setting the tomato "flowers" on these "leaves." Serve on small plates as an "extra" with cold meat.

## Salad Dressings

The dressing is an important part of salad, for it can make or mar the dish. There are several kinds, including French dressing, which is used mostly with crisp greenstuffs, cooked dressing which can be used with any kind of salad, and mayonnaise dressing which also can accompany any kind of salad but is especially used with fish, meat, and eggs. A Spanish proverb says, "A salad dressing requires a spendthrift for oil, a judge for salt, a miser for vinegar, a madman to mix them," and this is really the recipe for French dressing.

**French Dressing:**

1 cup salad oil, ⅓ cup vinegar, about 1 teaspoon salt, and pepper to taste.

Put the ingredients into a bowl and beat very thoroughly with an egg-beater until the globules of oil are as small as possible. Put into a bottle and shake well each time before using. French dressing may be varied to suit the salad or individual taste by adding more vinegar; ½ teaspoon curry powder; 1 teaspoon Worcester sauce; by substituting celery salt for the plain salt; by adding 1 to 2 teaspoons finely-chopped chives and parsley; 1 teaspoon minced onion; 2 tablespoons chopped chutney; or 1 tablespoon prepared horseradish or chopped mint.

**Cooked Dressings:**

Cooked dressings are the most commonly used and a quantity can be made and kept in a screw-stoppered jar. When needed, a portion can be taken out and mixed with fresh top milk (or thin cream, when there are no restrictions on the use of cream!) Here are two good recipes for this general purpose type of dressing:—

1. 2 tablespoons butter, 3 egg yolks, 1 tablespoon sugar, 1 cup milk, 1½ tablespoons flour, 1 teaspoon dry mustard, 1 teaspoon salt, 1 cup vinegar.

Melt the butter and add the flour gradually, then add the milk and cook until the mixture has thickened, stirring continuously. Mix the egg yolks and seasoning, and pour in the hot vinegar, stirring constantly until it is thick. Blend the two cooked mixtures and store in a cool place. When required take out half the quantity of dressing needed and thin to full amount with top milk. Use vegetable fat in place of butter if necessary.

2. This dressing can be made quite successfully with vegetable fat, and so is easy on the butter ration:—

1 tablespoon vegetable fat (or butter), 1 large teaspoon mustard, 2 beaten eggs, 4 tablespoons vinegar, 2 tablespoons sugar, ¼ teaspoon salt.

Mix together the sugar, mustard, and salt, add the beaten eggs and the vinegar, and mix until it is smooth. Melt the vegetable fat but do not heat, and add the mixture. Stir continually over very low heat or over boiling water until it is thick but not curdled. Strain through a fine sieve into a glass jar and store covered in a cool place. Break down with milk when required for use.

**Mayonnaise Dressing:**

1 egg yolk, 1 teaspoon salt, ½ teaspoon dry mustard, 1 cup salad oil, 2 tablespoons lemon juice or vinegar.

Put the yolk and seasonings in a bowl and beat well. Add 1 tablespoon vinegar (or lemon juice) and beat again. Beat in the oil gradually a few drops at a time at first and then more quickly. When it is thick, add the remainder of the vinegar (or juice). If the oil is added too rapidly, the dressing separates. To remedy this a second egg yolk must be beaten and the curdled mixture added little by little, while beating continues. Keep the dressing in a cool place, and use for any kind of salad.

### Use of Cream

When the restrictions on the use of cream are lifted, a cream salad dressing which requires no cooking will be found the quickest and easiest to make. Take half a cup of sweet cream and beat it until it is stiff. Add one teaspoon of dry mustard mixed with three teaspoons of sugar. Then add vinegar or lemon juice to taste, beat again slightly and use. When the cream is too fresh or thin to beat, mix in mustard and sugar, then add vinegar a little at a time and leave to stand. The vinegar will thicken the cream slightly.

**Condensed Milk Recipe:**

1 tin sweetened condensed milk, ¾ of the tin of vinegar, 1 teaspoon salt, 2 teaspoons mustard.

Put all the ingredients into a bowl and beat with an egg-beater until thick. Store in a screw-stoppered jar and dilute a quantity with fresh milk when needed. It keeps well.

Photographs by Sparrow Industrial Pictures Ltd.

## POPLAR IN AUTUMN

*Outside my window, through the grime*
*Of city smokes that curl and climb,*
*There is a shining reed of light*
*As graceful as a bird in flight;*
*There is a sudden flash of gold*
*Like fading tints on dead leaf-mould;*
*Or glimpse of green athwart the sky*
*As a gipsy breeze goes gaily by . . .*
*O! shining poplar tree so tall*
*That grows outside my office wall*
*I thank you for the magic way*
*Your beauty charms my cares away.*

—*Mary Kitching.*

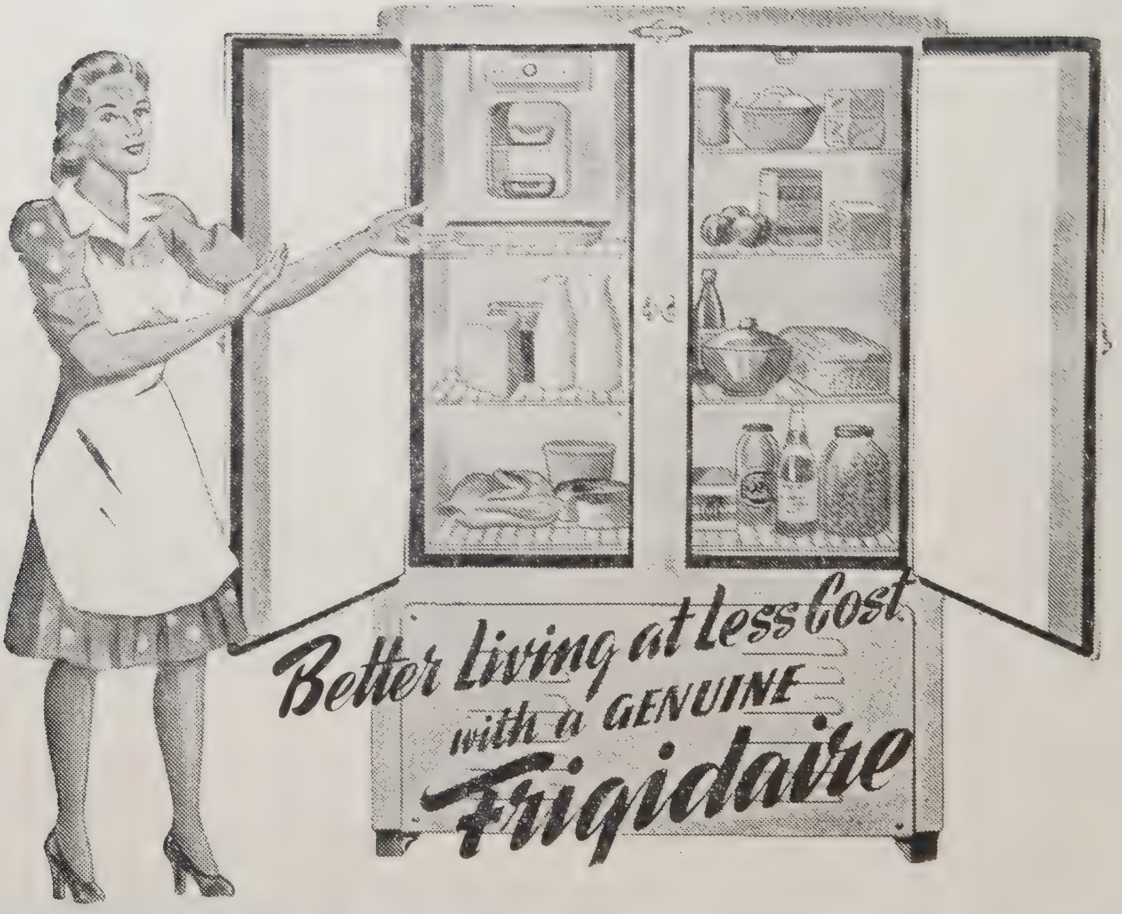
## Poultry Problems

To a person like myself, born and bred in London, and whose only acquaintance with fowls, livestock, and green fields was from a railway carriage window, country life in New Zealand was full of pitfalls, especially as I was just 21 and newly married. In fact, so many mishaps occurred during that first year that if it hadn't been for a sense of humour and a very good-natured husband, I am sure I would have developed a definite inferiority complex. For instance, I remember the time I asked the butcher for "some beef chops, please," and the poker-faced butcher enquired how many and would I take them or have them sent, before he broke into roars of laughter. Another day, when expecting my husband's boss and his wife to dinner, I cleaned and plucked a fowl for the first time. Alas, I had forgotten its crop, and when the bird appeared on the table its bosom had swollen so alarmingly that my visitors promptly christened it a puffin between their howls of merriment.

However, I think the following was the prize mishap of all, and although it happened ten years ago, my neighbours have never allowed me to forget it. We had just moved in to our cottage when the folk next door asked me to feed their pullets, as they wanted to go to town. "Just mix up some pollard and bran with water," were the instructions. I agreed to do this, though I hadn't the faintest idea what pollard was. I found some brown stuff in a sack and some bran in a bin, and throwing in a couple of handfuls of grain for luck, I mixed the whole lot together with water and spread it carefully on the various plates and dishes in the run. The pullets did not seem particularly enthusiastic, but I concluded that they were shy of me and left them to it.

The next morning my neighbour practically staggered in, wiping her eyes with her apron, and in her other hand she held two "concrete" plates liberally sprinkled with bran flakes and grain. Yes. the brown stuff was cement!

—**"Puffin," Hawke's Bay.**



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## MARY'S AT HOME

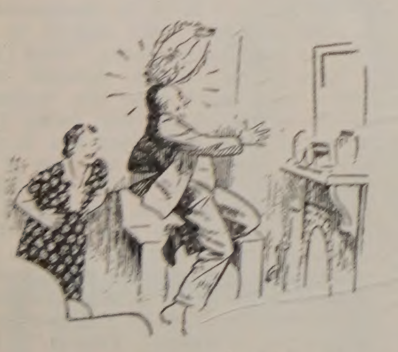
MY window is now framed with red geraniums set in glowing green leaves. They gleam even more brightly red in the rain and they love the sun, whereas many other flowers wilt under the burning rays.—**"M," Feilding.**

ONE wet day recently I decided to have a spring clean of useless papers, envelopes, etc., in my husband's writing desk, which was nearly overflowing. A handful of cartridges I put carefully in one of the pigeon holes. As I cleared out the papers I threw them into the open fireplace. My husband came in as the papers were burning well.

"There are some cartridges there. Did you see them?" he asked. I thought it my chance to have a little fun.

"I threw them in the fire. They won't do any harm, will they?" I replied innocently.

"Good Lord!" he ejaculated, as he stared fascinated at the blaze. I tiptoed behind him, then jumped hard on the floor, clapped my hands as loudly as I could, and shouted "Bang!" Hubby jumped, hitting the hanging lamp with his head. "Och," he muttered and stumped out of the room, but he soon returned and enjoyed the joke with me. Now I refer to that amusing incident as "The Time I Shot My Husband."—**"Odey," French Pass.**



I'VE just had a spell at my rug-making. The rug is the shape of a half-circle for beside my bed and is nearly completed. It is literally "every colour of the rainbow," for I was given a supply of rug wool already cut to measure, each card of fifty-six pieces being the complete range of colours in that particular brand. What beautiful wool it is to handle—thick, and soft as silk. The shades are like jewels—or flowers. I use a small patent hook on wide-mesh canvas and I find the work so fascinating that it is hard to put down! When the rug is finished and in use it can be washed if necessary.

**"London Lass," Wellington.**

MAY I join your band of "Good Neighbours"? I have long been a reader of the women's pages and find them interesting and educational. My home is in the backblocks and when the "Journal" arrives "himself" very often has the first peep at it, and I often notice that it is the women's section which he reads first! I enjoyed your article in the November issue—what brave women those three were in going to central Asia to bring Christianity to the people.

**—"Just Me," Maruia.**

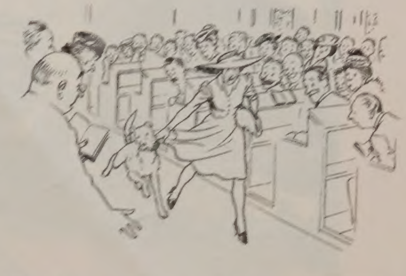
I HAVE a child, thin, wiry, and as unpredictable as the weather. She comes home from basketball matches with black eyes, or crushed fingers, or some other mishap. So many things seem to happen to her that her father, with a dazed look in his eyes, often mutters, "I don't believe it!" Even as a little mite the difficulties and predicaments she got into were borne only because I slowly and assiduously cultivated a sense of humour. One day she came home from school looking very smug and obviously hugging herself with delight. Suspecting the worst, I hinted that perhaps something had happened at school. Beaming with pleasure she replied, "Jill is a very naughty girl now. She was talking and Teacher put her in Talkers' Row."

Knowing my child to be the fastest and most irrepressible talker in the district I said, "But, Paddy, surely nobody else talks more than you."

Tossing me a look of scorn for my ignorance, she proudly answered, "Of course not, but I've been there all the year!"—**"Pussy," Auckland.**

A HUMOROUS incident is enjoyed by most people, but it can sometimes be most embarrassing to the person concerned. One Sunday morning in Brisbane I decided to go to church. It was exceedingly hot, so I donned a very large-brimmed hat. Arriving on the latish side I had to go up to the front of the church, obtaining a seat next to the aisle. A little later, to my horror, my dog trotted calmly up to the altar and started to explore. The minister gave him a startled glance and gently shooed him out, but Spot had more character than that and decided to continue his tour. I was the next victim. As soon as he discovered me he acted like a long-lost friend. I lowered my head and in a stage whisper ordered him to go out, but with the sheer cussedness of the male species he did the opposite, and as though to curry favour with me, he sat down upon his haunches, threw back his head, and raised his deep baritone in apparent praise, just as he had been taught to do before receiving his supper. There followed a hasty, undignified exit by myself and "dawg" amid much tittering. Was I thankful for that wide-brimmed hat!

**"Aussie," Auckland.**



I CAME across these words from Ecclesiastes the other day:

*"To every thing there is a season,*
*and a time to every purpose under the heaven:*
*A time to get, and a time to lose; a*
*time to keep, and a time to cast away."*

Such interesting pages in our "Journal" these days, and what a lovely number of new members.

**—"Roundabout," Hunterville.**

I LOVED hearing about treasured possessions. I am also most interested in the Rural Housing Survey and have posted my questionnaire. It is a lovely evening here as I write. Sometimes I think that farming is not worth all the worry, but at this time of the year, when the country is so lovely, town does not appeal to me. On Friday I was in town (I had to go in by bus) and when I came home it seemed like heaven after all the hurry and scurry, and the jolting of the stuffy, overcrowded bus as a final unpleasantness.—**"Cloudy," Ashburton.**

MY friends laughingly tell me that I have a school-ma'am look—not that I have ever had the honour to belong to the profession, nor do they refer to a "schoolgirl complexion." A short time ago a relative who is a country teacher had to leave because of a sudden illness. It fell to my lot to attend to some private matters for her and on the day I made the journey the relieving teacher was a fellow-passenger. A number of school children were awaiting the arrival of the train, and while the teacher was met and escorted to her lodgings the children accompanied me along the road. The parents told me the next day that the children had decided **I** was the new teacher. The laugh was against me!—**"C.V.W.," Waverley.**

IT has been so mild and dry lately that we have been working in the garden. My husband has been felling pines, a big row which runs across the farm and spoils two paddocks, so down they came. I hate to hear them crash, but it is good to have plenty of cones as they—and one sort of coal which I can't get!—are the only fuel that really suits my stove. It takes my ten-year-old and me quite a time to knock the cones off and carry them to the shed, but it's one way we can help.

—**"Bee," Timaru.**

*Home's just a corner of the world*
*that's sent to make us sweet,*
*A place for smoothing out the way*
*for tired hands and feet.*
*A little place for tenderness as well*
*as joy and song,*
*A little place to cheer and bless and*
*help loved folk along;*
*A place for toil, a place for rest, a*
*little place for prayer,*
*A place where everyone can play*
*his part, however small;*
*But home that is not full of love is*
*hardly home at all.*

—**Sent in by "Peggy," Pleasant Point.**

**I HAVE** been reading "W. H. Davies," by Thomas Moult. I think Davies and de la Mare are my favourite poets. Have you ever noticed how Davies delights in butterflies? I was amazed at the number of times he introduced them into his poems. I had a volume of de la Mare given me for my birthday and I do not think I've ever had a gift before with so much loveliness in it. Here's a fragment to add to your Winter Anthology:—

*Once was miller, and he would say,*
*"I go as white as lambs in May!*
*I go as white as rose on bush!*
*White as the white convolvulus!"*
*He snapped his fingers, began to*
*sing—*
*"White, by my beard, is everything!*
*Meal, and chalk, and frost, and hail;*
*Clouds and surf and ships in sail.*
*There's nowt on earth that brighter*
*shines*
*Than daisies, pinks, and columbines;*
*But what of ME when full moon*
*doth show*
*And mill and meadows are deep in*
*snow!"*

—(Walter de la Mare)

—**"Tinkle Tinkle," Port Chalmers.**

◆

## "Wild Life"

I AM sorry I have to disappoint so many readers who replied to my offer to loan the magazine "Wild Life." I have been simply deluged with letters and have sent the magazine to the writer of the first letter I received. I have requested her to send it on to the next on the list if the idea appeals to her. Thank you all for your friendly interest, and may I say that I have recently seen "Wild Life" displayed in a bookshop here, so perhaps copies are reaching New Zealand bookstalls by now. It is published by the United Press, 62-74 Flinders Street, Melbourne.—**"Native Flower," Waipukurau.**

◆

*The place that doth contain*
*My books, the best companions, is to me*
*A glorious court where hourly I converse*
*With the old sages and philosophers.*

—**Massinger.**

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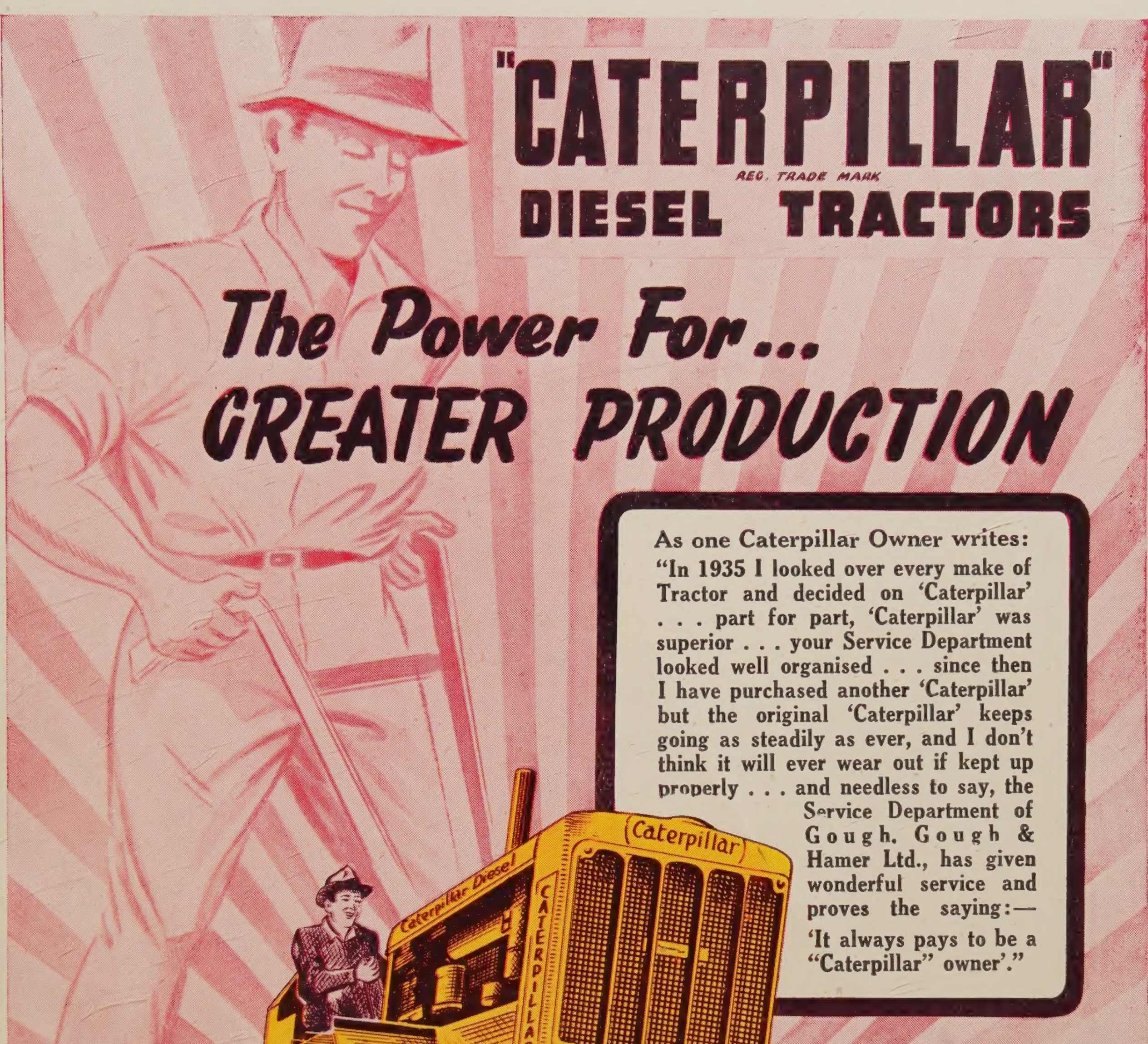

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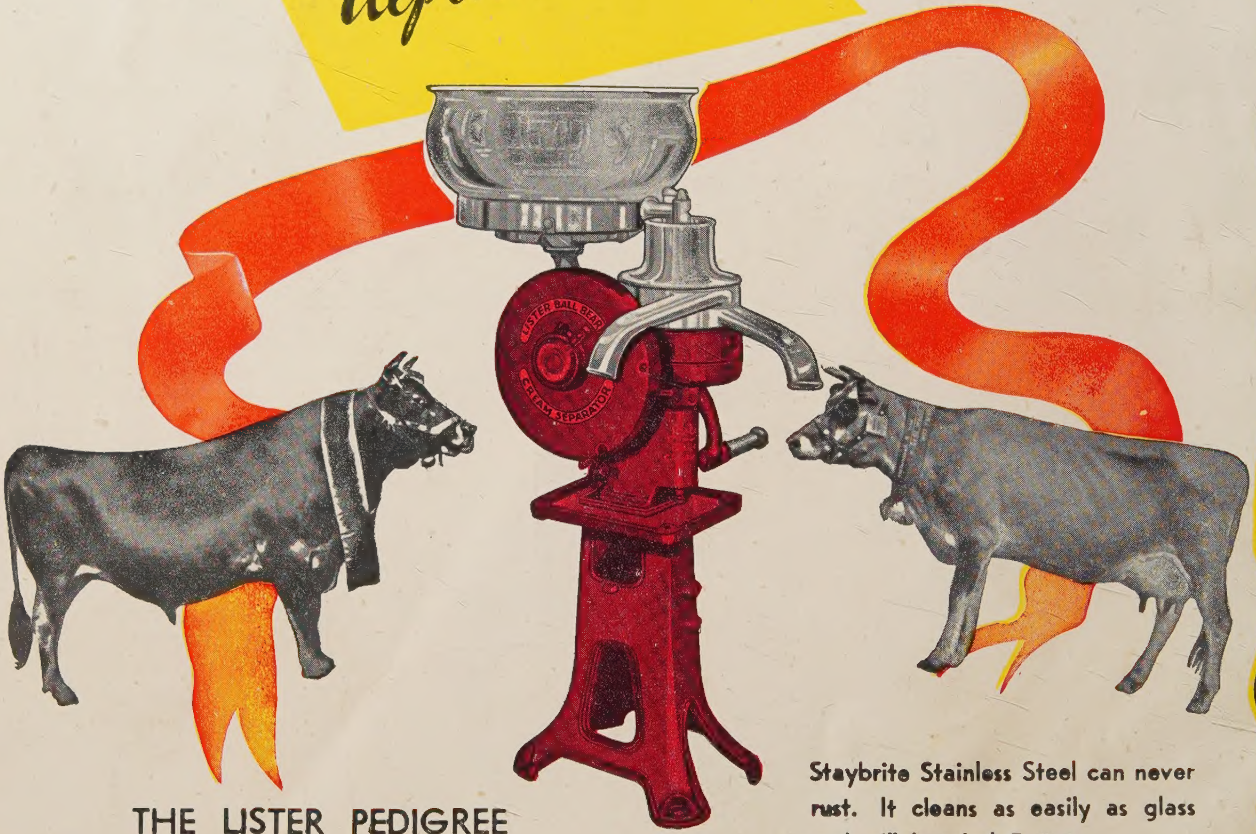

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